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THE PEARL FISHERY OF BANTAYAN.[1]

By LAWRENCE E. GRIFFIN.[2]

The Island of Bantayan lies between the northern ends of Negros and Cebu, at the head of the Tañon Channel. It is about 11 kilometers wide and 18 kilometers long. A string of islets, sometimes called the Don Islands, stretches 13 or 14 kilometers from its southwestern corner toward Negros. A single islet is located about 13 kilometers north of the outermost of the Dons. These islands, Bantayan on the east, the Dons on the south, and the last islet to the northwest, bound a shoal about 260 square kilometers in area. On the east and south of Bantayan, and south of the Dons, the shallow water extends for from 1 to 2 kilometers and then gradually deepens. At only one point, Santa Fé, on the southeast corner of Bantayan, does the water deepen suddenly. This is the only place where large boats can come to within half a kilometer of the main island. Almost all the small islands are inhabited, but their total population being is not much more than 1,000; that of Bantayan Island is over 37,000.

The islands are formed entirely of coral, all except Bantayan being flat, with an elevation not exceeding 5 meters. Curiously enough, the outermost of the Dons, Lipayran, is densely covered with virgin forest of first-group woods; the other islands have few trees except the coconut.

The passages between the Don Islands are all shallow, except between

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the last two, Doong and Lipayaran, where the channel is at least 4 fathoms deep. At the rise and fall of every tide, the water pours through these passages, at one place making whirlpools which are much feared by the pearl divers and fishermen. A strong current sweeps over the entire shoal.

During the months of May, June, November, and December, when usually the winds are light and calms prevail, the water is so clear that the bottom can plainly be seen in eight fathoms. At such times the divers float around over the shoal looking for pearl shells. There is nothing here that can be called a pearl bank, such as is found near Mindanao, Jolo, or Ceylon. The pearl shells are scattered singly over the sandy bottom, and it is a rare ocurrence for a diver to be so fortunate as to find half a dozen shells in a day's search; he is generally satisfied with one or two shells in a day. As a compensation for the small number of shells, the number of pearls found is proportionally very high and their quality good.

One pearl found this year was valued at 800 pesos (400 dollars United States currency); others, worth from 200 to 500 pesos (100 to 250 dollars United States currency) have not been rare. One of the Bantayan pearls was sold in Cebu about three years ago for 800 pesos (400 dollars United States currency). The mother-of-pearl gathered at Bantayan and disposed of to the local dealers for the year 1908 was worth 1,548 pesos (774 dollars). The pearls bought by the same dealers during this period were worth 4,584 pesos and 50 centavos (2,292 dollars and 25 cents United States currency). The *presidente* of Bantayan estimates that mother-of-pearl and pearls of about half this value are sold in such a way that there is no record of them. The total value of the pearl fisheries at this place is then not far from 9,000 pesos (4,500 dollars United States currency) per annum. The competition among the local Chinamen is so great that the prices for shell are almost equal to those paid in Cebu.

The shells are generally second grade in size, but of good quality. The search for them during the favorable season is so keen that the full-grown oysters have nearly all been gathered. If the shoal were smaller or the season longer, the pearl oyster would have disappeared long ago from this place.

The municipal council recently has passed an ordinance regulating the size of shells which may legally be taken. While this is the proper thing for the council to do, it is doubtful if the ordinance will have the slightest effect upon the pearl fishery.

This pearl fishery of Bantayan is illustrative of many native Philippine industries: while collectively bringing considerable money into the municipality and increasing to that extent the income of a part of the population, there is not the slightest chance of its attracting capital to Bantayan or of its being expanded by any modern method of working. However, Bantayan seems to be an ideal place for experiments in the

artificial culture of pearl oysters. If a practical method[3] of rearing the young oysters through the larval period to the time when they settle upon the bottom, and also for planting them over this great shoal could be discovered, the value of the Bantayan pearl fishery would be multiplied many hundred times, for every part of the shoal seems equally adapted to the needs of the oyster.

The pearl button factories of the United States for many years have been using the shells of clams found in the Mississippi River and its tributaries. These, once so numerous, are reduced now to such an extent that the industry is in danger of extinction. A knowledge of these facts led Prof. W. C. Curtis in 1898 to commence a study of the development of the clams and to experiment in rearing them under artificial conditions. Later he was joined in this work by Prof. George Lefevre. The experiments have reached a stage where they promise success, and lately the United States Fish Commission has built a laboratory on the upper Mississippi to enable these two men to carry on their experiments on a larger scale.

We have similar conditions affecting the pearl fisheries in the Philippines. Pearl shells are found in limited numbers in nearly all parts of the Archipelago. They are of a finer quality than the Ceylon or Persian shells, and consequently available for an immense variety of uses. All requisites for the growth of the oyster seem to be favorable, excepting some condition affecting the young at the time when they cease swimming and settle down. If a practical means of artificial planting could be introduced such as is now employed in Ceylon, the shores of the Philippine Islands could be lined with pearl.

The food fisheries of Bantayan are second in the Philippines, ranking next to those of Zamboanga. The value of the fishes disposed of to dealers (probably for export) during 1908 was 18,250 pesos (9,125 dollars United States currency). Boats come here from Cebu, Negros, and even Panay, to take cargoes of dried or pickled fish. At present there are 380 fish traps licensed by the municipality. In addition, large quantities of dried Holothurians (trepang, Bêche de mér) are prepared here, the export sales for last year amounting to 3,277 pesos and 11 centavos (1,638 dollars and 56 cents United States currency). This figure can be raised very considerably by increased industry on the part of the Bantayanos.

[3] One practical measure would be the complete closing of this bed, or at least half of it, for three years, so that there will be enough mature oysters left to repopulate it, and "clutch," i. e., dead coral, rocks, old shells, etc., should be scattered over the bottom so that the young may have material to which they can attach. In this way the bed could be made much more productive than when first opened.

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THE SUCCESSFUL TRANSFERENCE OF BLACK BASS TO THE PHILIPPINE ISLANDS, WITH NOTES ON THE TRANSPORTING OF LIVE FISH LONG DISTANCES.

By Alvin Seale.

(From the Section of Fisheries, Biological Laboratory, Bureau of Science, Manila, P. I.)

In April, 1907, I was authorized by the Insular Government to secure and bring to the Philippine Islands a shipment of live large-mouthed black bass [*Micropterus salmoides* (Lacépède)]. One hundred and seventy-five fingerlings, alive and in good condition, were secured at Folsom, California, upon the payment of a fee to the California State Fish Commission. Permission was secured from the United States Army Transport Service to ship the fish on the transport *Sherman,* and the success of this enterprise was due largely to the interest of both officers and men of that ship.

A small motor, driven by the electric current of the ship, was installed on the mess deck. An iron boiler, capacity 265 liters, was secured from the transport as an air reservoir, and a small air pump was connected with the boiler. A system of rubber pipes conducted the air from the boiler to the bottom of the cans in which the fish were carried and by working the motor only a short time sufficient air could be pumped into the reservoir to circulate through each can for four hours, the advantage of the reservoir being to maintain an even pressure and allow the air to cool. By means of a pipe, cold water could be kept running over the reservoir, which was also arranged so that ice could easily be packed around it.[1] The end of each of the rubber pipes leading

[1] A system of cold-water coils inside the reservoir would perhaps be a better, but more expensive method.

into the cans was drawn to a very minute point so that the air simply bubbled up through the water in a very small stream. (See fig. 1.)

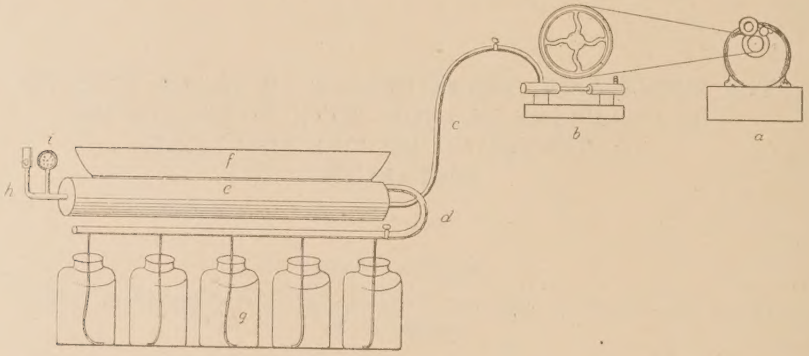

FIG. 1.—APPARATUS USED IN TRANSPORTING BLACK BASS TO THE PHILIPPINE ISLANDS.

When everything was ready, the fish were placed in six 38-liter milk cans which had previously been scalded and cleaned; about twenty-nine fish being allotted to each can. The temperature of the Spring Valley water in which the fish started was 11°; that of the air, 16°; and of the sea-water, 14°.

We sailed from San Francisco April 5, 1907. The next morning, while washing down decks, a sailor carelessly allowed some salt water to run into one can and fourteen of the fish therein were dead before we discovered the cause. However, not another fish was lost until we reached Honolulu. The second day out, food in the form of hard-boiled eggs, was offered the fish, but they would not eat. In the meantime the temperature of the water in the cans had been increased gradually to 21°, the air was 26°, and the sea water 25°.5.

When the transport coaled at Honolulu, despite all efforts to prevent it, more or less coal dust sifted into the cans, and six fish died during the two days' stay at that port. The remaining fish were alive when we reached Manila, May 4, twenty-eight days after starting from San Francisco.

When we were two days out from Honolulu the fish began to eat. They were fed on chopped crabs secured from the cold storage on the ship. They were given a small amount of food once a day, and they ate greedily. Shrimps were substituted occasionally for crabs.

A large pailful of water was taken from each can every day and replaced by one of fresh water from the ship's reservoir. On every third day each can, after the fish were poured into another, was thoroughly cleaned and scalded in order to prevent the growth of fungus; and every morning and evening the excreta and refuse in the bottom of the cans were siphoned out with a rubber pipe 18 millimeters in diameter. After leaving Honolulu the temperature of the water in

the cans was kept at about 21° until within two days of Manila, when it was increased gradually to 23°. When we arrived in Manila the temperature of the water in the cans was 23°, that of the air was 29°, and of the sea water 28°.

The fish had to be transported from Manila to Dagupan by rail, a distance of 193 kilometers, and thence 120 kilometers overland to Baguio, a mountain town in the Province of Benguet. This was the most difficult part of the trip, but it was accomplished in two days, with the loss of but one fish. The temperature of the water was lowered considerably during the last stages of the trip to Baguio, at which place the fish were planted in three distinct spots: One lot in the small lake near the Hotel Pines, another in a deep pool in the Trinidad River, and a third in the large Trinidad Lake. (See diagram, fig. No. 2.)

In December, 1909, I visited the places where these fish had been planted, and found that those placed in the small lake near the Hotel Pines had escaped early in the year; nothing was seen or heard of those planted in Trinidad River, but a tale was current of the capture of some large fish by the natives. The bass planted in Trinidad Lake had flourished and multiplied exceedingly well. A short trial with a fly gave sufficient proof that the lake was well stocked, as not only one of the original fish, but also one of the offspring was hooked; the latter (see Plate I) was 190 millimeters long and the parent fish was almost twice this length.

During February of the past year the small artificial lake in front of the Hotel Pines at Baguio was transformed into a good spawning pond by raising its walls, putting in concrete gates, and adding several loads of gravel for spawning beds. Twelve large bass caught in Trinidad Lake with a fly hook were transferred to this breeding pond on February 23. By May 4 they had spawned and there were hundreds of young bass in the pond, many of these have since been planted in other places, and some large bass were placed in Cayman Lake at Los Baños, Laguna Province. It is now an assured fact that people who live far inland may have this most desirable addition to their diet, and for those who care for it there is the pleasure and excitement of angling for this noble game fish.

TRANSFERRING MOSQUITO-EATING FISH.

In the year 1905 I was authorized by the Government of the Hawaiian Islands to secure and bring to Honolulu a shipment of live top minnows, *Fundulus heteroclitus* (Linn.), *Gambusia affinis* (B. & G.) and *Mallienesia latipinna* La S. to assist in ridding that place of the pest of mosquitoes. These fishes belong to the family *Poeciliidæ* and are found in the southern United States. They feed almost exclusively on the eggs and young of the mosquito. Fifteen hundred dollars United States currency was

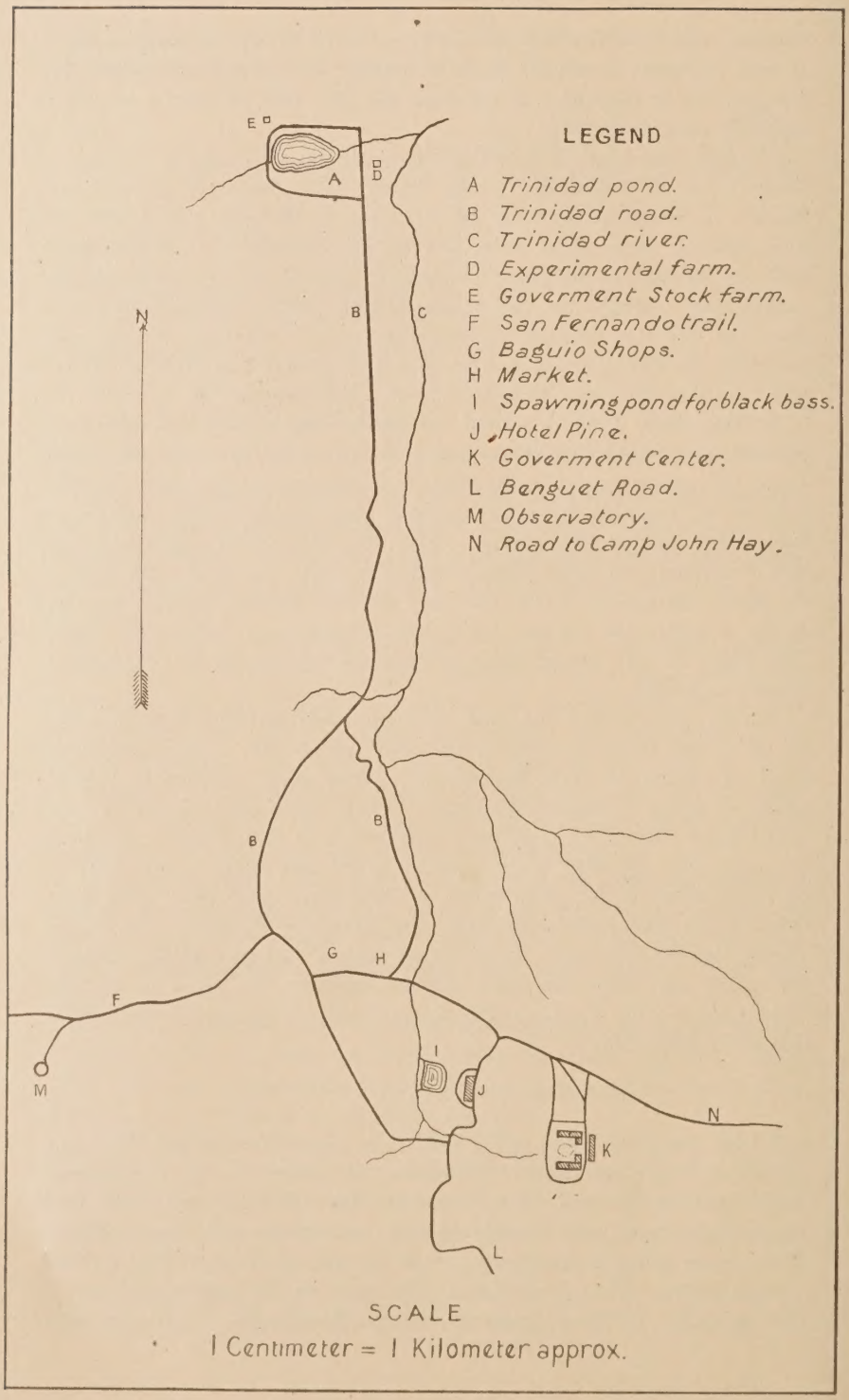

FIG. 2.—DIAGRAM OF BAGUIO AND VICINITY, SHOWING LOCATION OF BASS PONDS.

provided by the Territorial legislature for this venture. The fish were secured at Seabrook, Texas, and two weeks were spent in experimenting on conditions under which they could be transported through this long distance. It was proved that they could not successfully be iced and carried at a low temperature, a method which is usually most satisfactory, but that at a temperature of 23° they could be kept in ordinary milk cans with but little trouble.

On September 4, 1905, I left Seabrook, Texas, for Honolulu, with six 38-liter milk cans and 75 top minnows in each can. By adhering to the following routine, but little difficulty was experienced in the transportation of the fish. At 8 o'clock in the morning the fish were fed sparingly on prepared fish food, finely ground liver or hard-boiled eggs;[2] at 9.30 half the water in each can was siphoned from the bottom, thus cleaning out the can and removing all uneaten food and excrement, and an equal amount of fresh water was added. At noon, all the cans were aërated by means of a large bicycle, pump, a sponge being tied over the hose to separate the air into fine particles. At 4 o'clock in the afternoon 8 liters of water were siphoned from the bottom of the cans and fresh water added; and late in the evening the cans were again aërated. At each place where the water was changed it was first tested by placing two fresh fish in a bucket containing the new water at the proper temperature.

Twelve fish died between Galveston, Texas, and San Francisco, California, and fifteen between San Francisco and Honolulu. I landed in Honolulu from the steamship *Alameda* on September 15, 1905, after a twelve days' trip from Texas. Only 27 of the 450 fish were lost. They were in good condition when they arrived and were at once transplanted to small breeding ponds which had already been prepared for them, and they at once began work on the mosquito larvæ. There was but 0.56° difference between the natural temperature of the water at Seabrook and that at Honolulu.

At the present time, these fish have multiplied to such an extent that there are now several hundred thousand of them and they have been distributed to all the large islands and have very perceptibly diminished the mosquito pest, as is evidence by the following statement quoted from a letter from the governor of Hawaii written on May 23, 1910:

* * * I am glad to state that top minnows have been a decided success here. They were introduced, I believe, about six years or so ago, and have been placed in all the different districts of this island and in a number of places on the other islands. They have multiplied rapidly and the streams and ponds about Honolulu are full of them. I understand that in some cases where ponds have swarmed with the larvæ of mosquitoes, the top minnows have entirely cleaned them out within a few days after their introduction. At Waimanalo, on this island, where mosquitoes were usually plentiful, there are now scarcely

[2] It would be better to feed every third day.

any, owing to the introduction of this fish. One difficulty has been experienced, and that is that the natives and Chinese catch them in considerable quantities to eat and for bait.

As a result of my experience in carrying live fish great distances, I have found that there are three important things which must not be lost sight of. *First, cleanliness.* All cans in which the fish are transported must be cleaned thoroughly at least every third day with hot water; this prevents the growth of fungus. The water in the cans must always be pure and the excrement and uneaten food must be siphoned out each day. The fish must never be touched with the hands. *Second, temperature.* Above all else a sudden change in the temperature of the water must be avoided; it must never be changed all at once, but the fresh water must gradually be mixed with that in which the fish already are. It should take at least several hours to lower the temperature one or even one-half degree. *Third, vigilance.* Success in this work is attained only at the cost of eternal vigilance. When the fish are suffering from any cause whatsoever, they come to the top of the can continually and only by constant care and watching can the proper remedy be learned.

ILLUSTRATIONS.

PLATE I.

Large-mounted black bass [Micropterus salmoides (Lacépède)] from Trinidad Lake, Baguio, Benguet.

TEXT FIGURES.

FIG. 1. Apparatus used in transporting black bass to the Philippine Islands.
(*a*) Three-fourth horsepower electric motor.
(*b*) Air pump.
(*c*) Air supplying pipe to reservoir.
(*d*) Air supplying pipe from reservoir.
(*e*) 265-liter air reservoir (old iron hot-water boiler).
(*f*) Box for holding ice.
(*g*) 38-liter milk-can containing fish.
(*h*) Safety valve.
(*i*) Pressure indicator.
FIG. 2. Diagram of Baguio and vicinity, showing location of bass ponds.

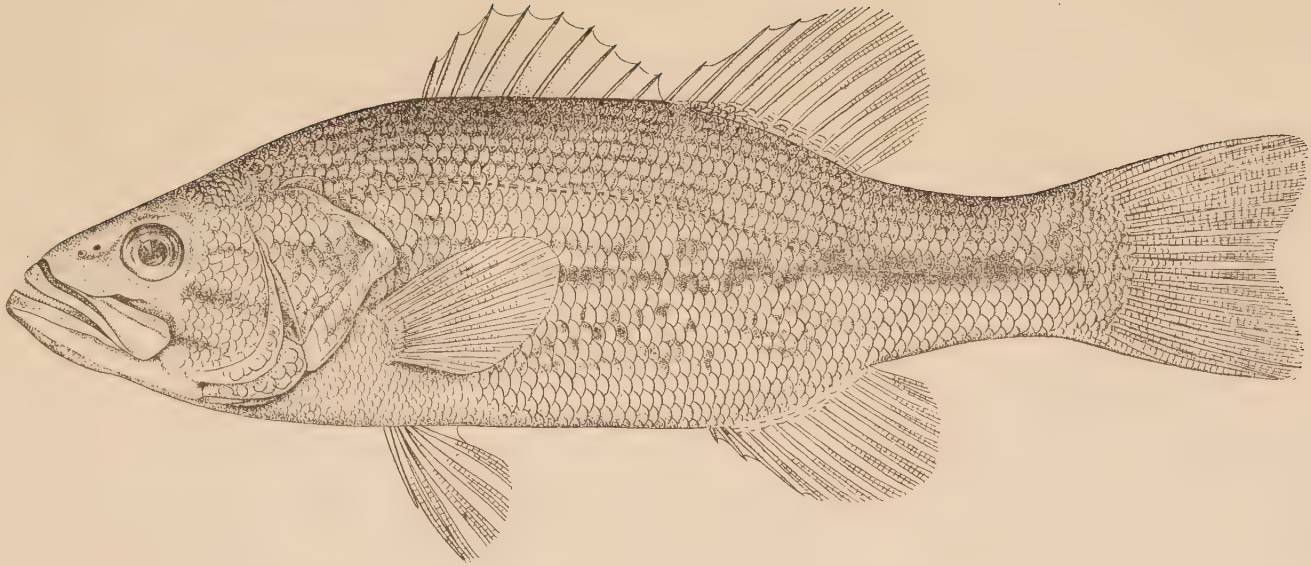

PLATE I.

CONTRIBUTIONS TO THE LEPIDOPTEROUS FAUNA OF THE PHILIPPINES.

By W. Schultze.

(*From the Entomological Section, Biological Laboratory, Bureau of Science, Manila, P. I.*)

A. NEW LEPIDOPTERA.

Fam. LYCAENIDAE.

TARUCUS Moore.

Lep. Ceylon (1881), 1, 81.
Type: *T. theophrastus* Fabr.

Tarucus leopardus sp. nov. *Pl. I, fig. 9.*

♂. Upperside of wings irridescent purplish blue with a narrow dull black line along outer margin; cilia white. Tail black, tipped with white. Hind wing with two indistinct submarginal spots at posterior angle. Underside of wings white with a faint ochraceous tinge and numerous dark brown markings as follows: A narrow subcostal band from base to middle of fore wing, thence obliquely toward posterior outer angle; basal area with three triangular patches, the medial one being most prominent; outer area with three oblique bars from the costa, the second, which is the longest, reaching vein IV; a prominent, nearly round, postmedial spot between veins III and IV; a submarginal band and a marginal row of six very small spots, each between two veins and a very fine marginal line. Cilia white. Hind wing with a basal bar, six antemedial transverse streaks, two medial transverse streaks, two postmedial streaks, and a postmedial band from inner margin to vein VI; a prominent submarginal band, six submarginal spots and a fine anteciliary line. The submarginal area between veins I and III is dark ochraceous and the two black spots upon it are surrounded by a highly metallic, green line.

♀. Upperside of wings grayish brown with a bluish irridescence on basal half. Discal area whitish. All markings on underside similar to those above although less diffused. Hind wing with the submarginal row of spots large and distinct. Underside similar to that in ♂; all markings somewhat larger.

Length of wing: ♂, 11 millimeters; ♀, 13.5 millimeters.

Luzon, Province of Camarines, Paracale, P. I. (*J. P. Iddings* collector).

Type ♂, ♀ and cotype ♂ No. 12743 in Entomological Collection, Bureau of Science, Manila, P. I.

Fam. EUPTEROTIDÆ.

PSEUDOGANISA gen. nov.

Type: *P. currani.*

Palpi upturned and thickly fringed with hair. Fore wing broad, the apex rounded, outer margin produced at vein IV. Veins VII, VIII, IX, stalked. Outer margin of hind wing very much pronounced at vein IV and sharply angulate. Closely related to Ganisa.

Pseudoganisa currani sp. nov. *Pl. I, fig. 2.*

♂. Head ochraceous brown. General color of thorax, abdomen and wings tawny above; collar cream-white; basal half of the fore wing with shiny scales in certain lights. Fore wing with a dark brown spot at the end of cell and straight oblique postmedial line and two brownish submarginal patches between veins II and IV. Hind wing with the basal half hairy, the postmedial line slightly curved outward. Underside of thorax, abdomen and wings yellowish ochraceous. All markings as on upper side, with reddish suffusions, especially between postmedial line and margin.

♀ unknown.

Length of wing: ♂, 28 millimeters.

Mindanao, Port Banga, District of Zamboanga, P. I. (*W. I. Hutchinson* collector).

Type ♂ No. 8748 in Entomological collection, Bureau of Science, Manila, P. I.)

I take pleasure in naming this species in honor of Mr. H. M. Curran, who has contributed a large number of insects to our collection.

Fam. LYMANTRIIDÆ.

NUMENES Walker.

Cat. Lep., Het., British Mus. (1855), **3**, 662.
Type: *N. siletti* Walk.

Numenes insolita sp. nov. *Pl. I, fig. 4.*

♂. Head and thorax above dark brown, fore legs fuscous. Palpi, thorax below, middle and hind legs, as well as abdomen, yellow. Latter

with a dark brown spot on the second segment dorsally. Fore wing creamy white, with a dark brown band from the base, along inner margin, to posterior outer angle. A narrow oblique antemedial and a broad postmedial band from costa to inner margin. The postmedial band somewhat ampliated beyond the cell. Hind wing yellow with an irregular, dark brown, marginal band. Underside of wings pale yellow. Fore wing with the postmedial band and hind wing with the marginal band as above.

♀ unknown.

Length of wing: ♂, 21 millimeters.

PALAWAN, Iwahig, P. I. (*W. Schultze* collector).

Type ♂ No. 10873 in Entomological Collection, Bureau of Science, Manila, P. I.

This species seems to be closely related to *N. contrahens* Walker, from Sarawak, Borneo, which has the fore wings testaceous.

ADLULLIA Walker.

Cat. Lep., Het., British Mus. (1865), **33**, 392.
Type: *A. lunifera* Walk.

Adlullia benguetana sp. nov. *Pl. I, figs. 6, 7.*

♂. Head, thorax and abdomen ventrally, anal tuft and legs ochraceous. Thorax dorsally, and fore wing red-brown, the latter with the discal area of postrior margin irrorated with black scales. Abdomen dorsally and hind wing dark fuscous.

♀. Head, thorax above, and front and middle legs yellow, the latter somewhat paler; hind legs and thorax below fuscous. Abdomen dark brown, the anal tuft cream-white. Fore wing dark, fuscous brown; costal area, veins and cilia bright yellow. The interspaces between the veins irrorated with yellow scales, especially toward outer margin. Hind wing dark brown, the cilia fuscous brown.

Length of wing: ♂, 13.5 millimeters; ♀, 20 millimeters.

Found *in copulâ*: LUZON, Benguet, Baguio, P. I. (*J. P. Iddings* collector).

Types, ♂ and ♀, No. 12733 in Entomological Collection, Bureau of Science, Manila, P. I.

Adlullia samarensis sp. nov. *Pl. I, fig. 1.*

♀. Head, antennæ and legs yellow, the latter irrorated with brown scales. Thorax above pale reddish brown with a few very long yellowish hairs. Thorax below and abdomen dark brown. Fore wing reddish brown; a large, lunular, cream-white, discal spot between veins III and V. A dentated row of yellow spots along outer margin and cilia. Posterior margins with a few very long, yellow hairs. Hind wing with the basal

half dark brown, the apical half yellow. Underside of wings similar to upper, though the discal spot of the fore wing is not as prominent.

♂ unknown.

Length of wing: ♀, 30 millimeters.

SAMAR, P. I. (*G. L. Parks* collector).

Cotypes, ♀ No. 12783 in Entomological Collection, Bureau of Science, Manila, P. I.

Fam. ARCTIIDÆ.

Subf. LITHOSIINÆ.

DEILEMERA Hübner.

Verz. bek. Schmetterl. (1818), 178.
Type: *D. evergista* Stoll.

Deilemera gratia sp. nov. *Pl. I, fig. 3.*

♂. Head, collar and thorax cream-white. Palpi with a black spot on second and third joints laterally. A black spot on front and one on top of head, two on the collar, one on each tegula and three medially on the thorax. Legs white; coxæ and thorax below black-spotted. Abdomen pale yellow, with black segmental bands dorsally and tow rows of lateral spots. Wings snow-white, semi-transparent. Fore wing with the veins more or less fuscous. Underside similar to upper, the fuscous color more pronounced especially along the costal margin of the fore wing.

♀. The black, abdominal band on the penultimate segment very wide and bi-emarginate posteriorly; anal segment cream-white.

Length of wing: ♂, 28.5 millimeters, ♀, 29 millimeters.

LUZON, Province of Benguet, Pauai, P. I., 2,250 meters (*R. C. McGregor* collector).

Types, ♂ and ♀, No. 11136 in Entomological Collection, Bureau of Science, Manila, P. I.

MONOTAXIS Hampson.

Cat. Lep., Phal., British Mus. (1900), **2**, 181.
Type: *M. trimaculata* Hamps.

Monotaxis montanus sp. nov. *Pl. I, fig. 10.*

♀. Head, collar, tegulæ, thorax and abdomen below ochraceous. Thorax and extremities of tegulæ metallic blue-green. Abdomen fuscous. Fore wing ochraceous, the costal margin metallic blue-green except the apical third. A band from base along posterior margin expanding into a large patch below the cell and another wedge-shaped, postmedially. Hind wing pale ochraceous, the apical area fuscous.

♂ unknown.

Length of wing: ♀, 18 millimeters.

Luzon, Province of Benguet, Lutab, P. I., 1,000 meters (*R. C. McGregor* collector).

Type ♀ No. 12701 in Entomological Collection, Bureau of Science, Manila, P. I.

Fam. GEOMETRIDÆ.

Subf. LARENTIINÆ.

PHTHONOLOBA Warren.

Nov. Zool. (1894), 1, 397.
Type: *P. decussata* Moore.

Phthnoloba benguetana sp. nov. *Pl. I, fig. 5.*

♀. Head, collar and thorax bright green, a dark brown spot on each tegula. Abdomen and legs pale green, the latter streaked with brown and the former with a brown spot on the first segment. Fore wing bright green with a brown discocellular spot and double antemedial, medial, postmedial and submarginal brown zig-zag lines. The postmedial lines form a brown patch in the discal area and at the posterior margin. Hind wing pale green with a brown discocellular spot, a curved postmedial line and an internal fuscous marginal band. Cilia with a series of fuscous spots at the ends of the veins.

♂ unknown.

Length of wing: ♀, 19 millimeters.

Luzon, Province of Benguet, Pauai, P. I., 2,250 meters (*R. C. McGregor* collector).

Cotypes, ♀ No. 11177 in Entomological Collection, Bureau of Science, Manila, P. I.

Fam. TINEIDÆ.

Subf. GELECHIINÆ.

HYPERPERISSA Walsingham.

Cat. East. Lep., Het. (1900), 2, 546.
Type: *H. aurantiaca* Semper.

Hyperperissa pulchella sp. nov. *Pl. I, fig. 8.*

♀. Head, thorax, abdomen and legs dark, metallic blue. Wings golden yellow. Fore wing with a streak at the base and the apical third dark, metallic blue. Hind wing with the apical dark metallic blue, the inner margin of which is nearly straight.

♂ unknown.

Length of wing: ♀, 14 millimeters.

Luzon, Province of Benguet, Lutab, 1,000 meters, and Pauai, P. I., 2,250 meters (*R. C. McGregor* collector).

Type ♀ No. 12686 and paratype No. 11148 in Entomological Collection, Bureau of Science, Manila, P. I.

B. SPECIES OF LEPIDOPTERA HITHERTO UNRECORDED FROM THE PHILIPPINES.

Suborder RHOPHALOCERA.

Fam. LYCÆNIDÆ.

CHILADES Moore.

Lep. Ceyl. (1881), **1**, 76.
Type: *C. laius* Cram.

CHILADES TROCHILUS Frey.

Lycæna trochilus Freyer, Neuere Beitr. Schmetterl. (1844), **5**, 98, *pl. 140, fig. 1.*
Lycæna putli Kollar, Hügel's Kaschmir (1848), **4**, pt. 2, 422.
Chilades putli Moore, Lep. Ceyl. (1881), **1**, 77, *pl. 35, fig. 4.*
Chilades trochilus de Nicev., Butterfl. of India, Burma, and Ceylon (1890), **3**, 91.
Zizera putli Semper,[1] Schmetterl. d. Phil. Ins. (1892), **5**, 172, footnote.

LUZON, Mountain Province, Kalinga, Sabuc, P. I. (10561 *H. M. Curran*).

ZIZERA Moore.

Lep. Ceyl. (1881), **1**, 78.
Type: *Z. alsus* Wien. Verz.

ZIZERA MORA Swinh.

Zizera mora Swinhoe, Proc. Zoöl. Soc., Lond. (1884) 506, *pl. 47, fig. 2;* de Nicev., Butterfl. of India, Burma and Ceylon (1890), **3**, 118.

LUZON, Manila, P. I. (*8019 W. Schultze*).

ZIZERA GAIKA Trim.

Lycæna gaika Trimen, Trans. Ent. Soc. Lond., ser. 3 (1862), **1**, 403.
Zizera gaika Butl., Proc. Zoöl. Soc. Lond. (1884), 484; de Nicev., Butterfl. of India, Burma and Ceylon (1890), **3**, 118, *pl. 26, fig. 174.*

LUZON, Manila, P. I. (7351 *W. Schultze*); Laguna, Sta. Maria, P. I. (8532 *H. M. Curran*); Rizal, Montalban Gorge, P. I. (9128 *F. D. Nash*).

CASTALIUS Hübner.

Verz. bek. Schmetterl. (1816), 70.
Type: *C. rosimon* Fabr.

CASTALIUS ELNA Hewits.

Lycæna elna Hetwits., Ex. Butterfl. (1876), **5**, Lycæna *pl. 1, fig. 8.*
Castalius elna Moore, Proc. Zoöl. Soc. Lond. (1877), 587; de Nicev., Butterfl. of India, Burma and Ceylon (1890), **3**, 201; Bingham, Fauna British Ind., Butterfl., (1907), **2**, 430.

PALAWAN, Iwahig, P. I. (11166 *W. Schultze*).

[1] I quote this species again, as Semper mentions it as rather doubtful from the Philippines.

Fam. PAPILIONIDÆ.

Subf. PAPILIONINÆ.

PAPILIO Linnæus.

Syst. Nat. (1758), 1, 458.
Type: *P. priamus* Linn.

PAPILIO XUTHUS Linn.

Papilio xuthus Linn., Syst. Nat. (1767), 1, 751.
Papilio xanthus Rothsch., Nov. Zool. (1895), 2, 278.
Papilio xuthus Bingham, Fauna British Ind., Butterfl. (1907), 2, 38.

LUZON, Province of Benguet, Pauai, P. I., 2,250 meters (11130 *R. C. McGregor*).

PAPILIO NEPTUNUS Guér.

Papilio neptunus Guérin, Deless. Souv. Inde (1843), 2, 69; Wall., Trans. Linn. Soc. (1865), 25, 42; Druce, Proc. Zoöl. Soc. Lond. (1873), 357; Distant, Rhop. Malay. (1886), 335.

MINDANAO, P. I. (13196 *C. I. Overman*).

Fam. HESPERIDÆ.

PADUKA Distant.

Rhopal. Malay. (1886), 375.
Type: *P. glandulosa* Dist.

PADUKA GLANDULOSA Dist.

Paduka glandulosa Distant, *loc cit. 376, pl. 35, fig. 5.*

PALAWAN, Puerto Princesa, P. I. (8757 *C. M. Weber*).

Suborder HETEROCERA.

Fam. SPHINGIDÆ.

Subf. PHILAMPELINÆ.

ANGONYX Boisduval.

Spec. Gen. Lep. Het. (1875), 1, 317.
Type: *A. testacea* Walk.

ANGONYX TESTACEA Walk.

Perigonia testacea Walk., Cat. Lep., British Mus. (1856), 8, 102.
Angonyx testacea Rothsch. and Jord., Rev. Lep. Fam. Sphing. (1903), 544.

LUZON, Manila, P. I. (11050 *R. Werm*).

Subf. SESSIINÆ.

CEPHONODES Hübner.

Verz. bek. Schmetterl. (1816), 131.
Type: *C. hylas* Linn.

CEPHONODES TITAN Rothsch.

Cephonodes titan Rothschild, Nov. Zool. (1899), 6, 69; Rothsch. and Jord., Rev. Lep. Fam. Sphing. (1903), 469.

LUZON, Province of Benguet, P. I., 1,850 meters (12726 *J. P. Iddings*).

Fam. NOTODONTIDÆ.

GARGETTA Walker.

Cat. Lep. Ins., British Mus. (1864), **32**, 455.
Type: *G. costigera* Walk.

GARGETTA COSTIGERA Walk.

Gargetta costigera Walk., *loc. cit.* 455; Hamps., Fauna British Ind. Moths (1892), **1**, 135.

LUZON, Province of Cagayan, Tuguegarao, P. I. (9447 *W. Williamson*).

Fam. COSSIDÆ.

COSSUS Fabricius.

Ent. Syst. (1794), **3**, pt. 2, 3.
Type: *C. ligniperda* Fabr.

COSSUS ACRONYCTOIDES Moore.

Brachylia acronyctoides Moore, Proc. Zoöl. Soc. Lond. (1879), 411, *pl. 34, fig. 4.*

Cossus acronyctoides Hamps., Fauna British Ind., Moths (1892), **1**, 305.

LUZON, Province of Laguna, Los Baños, P. I. (12901 *E. M. Ledyard*).

Fam. LIMACODIDÆ.

NAGODA Moore.

Lep. Ceyl. (1887), **3**, 542.
Type: *N. nigricans* Moore.

NAGODA NIGRICANS Moore.

Nagoda nigricans Moore, *loc. cit.*, 542, *pl. 211, fig. 10;* Hamps., Ill. Typ. Lep. Het. British Mus. (1893), **9**, *pl. 161, fig. 1;* Fauna British Ind., Moths (1892), **1**, 401.

LUZON, Province of Benguet, Trinidad, P. I. (8352 *C. S. Banks*).

Fam. LASIOCAMPIDÆ.

ODONESTIS Germar.

Prod. (1811), 49.
Type: *O. potatoria* Fabr.

ODONOSTIS PLAGIFERA Walk.

Lebeda plagifera Walk., Cat. Lep. Ins., British Mus. (1855), **6**, 1459; Butl., Ill. Typ. Lep. Het., British Mus. (1881), **5**, 73, *pl. 99, fig. 5.*

Odonestis plagifera Hamps., Fauna British Ind., Moths (1892), **1**, 427.

LUZON, Province of Benguet, Baguio, P. I. (10494 *W. Schultze*).

Fam. LYMANTRIIDÆ.

AROA Walker.

Cat. Lep. Het., British Mus. (1855), **4**, 791.
Type: *A. discalis* Walk.

AROA MAJOR Hamps.

Aroa major Hamps., Ill. Typ. Lep. Het. British Mus. (1893), **9**, 74, *pl. 159, fig. 3;* Fauna British Ind., Moths (1892), **1**, 437.

LUZON, Province of Benguet, Baguio, P. I. (10451 *W. Schultze*).

LÆLIA Stephens.

Syst. Cat. Brit. Ins. (1829), **2**, 52.
Type: *L. cœnosa* Hubn.

LÆLIA SUFFUSA Walk.

Ricine suffusa Walk., Cat. Lep. Het., British Mus. (1855), 4, 824.
Prorodeca angulifera Walk., *loc. cit.*, 919.
Lælia suffusa Hamps., Fauna British Ind., Moths (1892), **1**, 441.

LUZON, Manila, P. I. (3123, 5215, *W. Schultze*); NEGROS OCCIDENTAL, Bago, P. I. (6282 *C. S. Banks*).

DASYCHIRA Stephens.

Ill. Brit. Ent., Haust. (1829), **2**, 58.
Type: *D. pudibunda* Linn.

DASYCHIRA HORSFIELDI Saund.

Arctia horsfieldii Saund., Trans. Ent. Soc. Lond. (1851), **1**, 126, *pl. 12, figs. 1, 2.*
Dasychira horsfieldi Hamps., Fauna British Ind., Moths (1892), **1**, 448.

PALAWAN, Iwahig, P. I. (10870 *W. Schultze*).

Fam. ARCTIIDÆ.

Subf. LITHOSIINÆ.

MANOBA Walker.

Journ. Linn. Soc., Zool. (1863), **7**, 62.
Type: *M. implens* Walk.

* MANOBA FRACTILINEA Snell.[2]

Pitane fractilinea Snell., Veth's Midd.-Sumatra Lep. (1880), 38; Kirby, Cat. Het. (1892), 364.
Eugoa multipuncta Hamps., Ill. Lep. Het., British Mus. (1893), **9**, 81, *pl. 158, fig. 3.*
Æmene multipuncta Hamps., Fauna British Ind., Moths (1894), **2**, 93.
Stictane fractilinea Hamps., Cat. Lep., Phal. (1900), **2**, 259.

LUZON, Manila, P. I. (4908 *C. S. Banks*).

[2] All species preceded by an * were determined by Sir George Hampson of the British Museum.

MILTOCHRISTA Hübner.

Verz. bek. Schmetterl. (1818), 166.
Type: *M. miniata* Forst.

MILTOCHRISTA SEMIFASCIA Walk.

Setina semifascia Walk., Cat. Lep. Ins. British Mus. (1854), **2**, 521.
Lyclene semifascia Moore, Lep. Ceylon (1882), **2**, *pl. 103, fig. 7.*
Miltochrista semifascia Hamps., Fauna British Ind., Moths (1894), **2**, 109.

LUZON, Province of Benguet, Baguio, P. I. (8818 *C. S. Banks*).

DARANTASIA Walker.

Journ. Linn. Soc. Lond. (1859), **3**, 186.
Type: *D. cuneiplena* Walk.

DARANTASIA CUNEIPLENA Walk.

Darantasia cuneiplena Walk., *loc. cit.* Swinh., Cat. Het. Lep. (1892), **1**, 99, *pl. 3, fig. 17;* Hamps., Cat. Lep., Phal. (1900), **2**, 273.

NEGROS, Mount Canlaon, P. I. (12892 *C. S. Banks*).

Subf. NOLINÆ.

CELAMA Walker.

Cat. British Mus. (1864), **32**, 500.
Type: *C. bifascialis* Walk.

CELAMA TÆNIATA Snell.

Nola tæniata Snell., Tijdschr. v. Ent. (1874), **17**, 65, *pl. 6, fig. 1;* Kirby, Cat. Het. (1892), 372.
Roesella fragilis Swinh., Trans. Ent. Soc. Lond. (1890), 184; Hamps., Fauna British Ind., Moths (1894), **2**, 139; Kirby, *loc. cit.* 376.
Sorocostia mesozana Lucas, Proc. Linn. Soc. N. S. W. (1890), **4**, 1075; Kirby, *loc. cit.* 377.
Celama tæniata Hamps., Cat. Lep., Phal. (1900), **2**, 17.

LUZON, Manila, P. I. (2377, 3978, 5148, *C. S. Banks*).

Subf. NYCTEOLINÆ.

EARIAS Hübner.

Verz. (1818), 395.
Type: *E. clorana* Linn.

*EARIAS INSULANA Boisd.

Tortrix insulana Boisd., Faune Ent. Madag. (1833), 121, *pl. 16, fig. 9.*
Earias insulana Rogenh., Verh. Zoöl. Bot. Ges. Wien. (1870), **20**, 869.
Earias smardinana Zell., Lep. Mic. Wahlb. Caffr. (1852), 79.
Earias frondosana Walk., Cat. Lep. British Mus. (1863), **27**, 204.
Earias simillima Walk., *op. cit.* (1866), **35**, 1775.
Earias siliquana Stainton, Trans. Ent. Soc. Lond. (1865), ser. 3, **5**, 89.
Earias gossypii Frauenf., Verh. Zoöl. Bot. Ges. Wien. (1867), **17**, 791.
Earias tristrigosa Butl., Proc. Zoöl. Soc. Lond. (1881), 614; *op. cit.* (1883), 157.
Earias insulana Swinh., Cat. Lep. Het. (1892), **1**, 133; Hamps., Fauna British Ind., Moths (1894), **2**, 133.

LUZON, Manila, P. I. (2936 *C. S. Banks*).

Fam. NOCTUIDÆ.

Subf. TRIFINÆ.

AGROTIS Ochsenheimer.

Eur. Schmetterl. (1816), 4, 66.
Type: *A. segetis* Schiff.

AGROTIS SEGETIS Schiff.

Noctua segetum Schiff., Wien. Verz. (1876), 252.
Agrotis segetum Leech, Proc. Zoöl. Soc. Lond. (1889), 499; Meyr., Handb. British Lep. (1895), 91.
Agrotis segetis Hamps., Fauna British Ind., Moths (1894), 2, 181.

LUZON, Province of Benguet, Pauai, P. I., 2,250 meters (11385 *R. C. McGregor*).

AGROTIS BICONICA Koll.

Agrotis biconica Koll., Hügel's Kaschmir. (1844), 4, 480.
Agrotis exigua Koll., *loc. cit.* 481.
Agrotis spiculifera Guen., Noct., (1852), 1, 266.
Agrotis aristifera Guen., *op. cit;* Moore, Lep. Ceylon (1884), 3, 32, *pl. 147, fig. 5.*
Agrotis biconica Hamps., Fauna British Ind., Moths (1894), 2, 182.

LUZON, Province of Benguet, Pauai, P. I., 2,250 meters (11377 *R. C. McGregor*).

AGROTIS C-NIGRUM Linn.

Phalæna-Noctua c-nigrum Linn., Syst. Nat. (1758), 852.
Noctua c-nigrum Schiff., Wien. Verz. (1776), 77.
Graphiphora c-nigrum Steph., Ill. British Ent. Haust. (1829), 2, 136.
Agrotis c-nigrum Hamps., Fauna British Ind., Moths (1894), 2, 188.

LUZON, Province of Benguet, Pauai, P. I., 2,250 meters (11380 *R. C. McGregor*).

AGROTIS YPSILON Rott.

Noctua ypsilon Rott., Naturf. (1776), 11, 141.
Bombyx spinula Esp., Schmetterl. Eur. (1782), 3, *pl. 63, fig. 6, 7.*
Noctua suffusa Fabr., Mant., Ins. (1787), 2, 157.
Agrotis suffusa Treit., Schmetterl. Eur. (1825), 5, 152.
Agrotis ypsilon Hamps., Fauna British Ind., Moths (1894), 2, 182.

LUZON, Manila, P. I. (9748 *W. Schultze*).

AGROTIS INGRATA Butl.

Agrotis ingrata Butl., Ann. Mag. Mat. Hist. (1878), V, 1, 162; Ill. Typ. Lep. Het., British Mus. (1878), 2, 27, *fig. 9.*

LUZON, Province of Benguet, Pauai, P. I., 2,250 meters (11185, 11384, *R. C. McGregor*).

ACRONYCTA Ochsenheimer.

Eur. Schmetterl. (1816), 4, 62.
Type: *A. leporina* Linn.

ACRONYCTA SINENS Walk.

Orthosia sinens Walk., Cat. Lep. Ins., British Mus. (1857), 11, 746.
Acronycta sinens Hamps., Fauna British Ind., Moths (1894), 2, 241.

Luzon, Manila, P. I. (9645); Benguet, Baguio, P. I. (10462 *W. Schultze*).

CURGIA Walker.

Journ. Linn. Soc. Lond. (1864), **7**, 166.
Type: *C. nonagrica* Walk.

Curgia nonagrica Walk.
Curgia nonagrica Walk., *loc. cit.*
Radinacra euthusa Hamps., Ill. Typ. Lep. Het., British Mus. (1891), **8**, 79, *pl. 145, fig. 1.*

Luzon, Manila, P. I. (3821, 7880 *W. Schultze*); Tarlac, Anao, P. I. (9455 *R. C. McGregor*).

LEUCANIA Ochsenheimer.

Eur. Schmetterl. (1816), **4**, 81.
Type: *L. comma* Linn.

Leucania inframicans Hamps.
Leucania inframicans Hamps., Ill. Typ. Lep. British Mus. (1893), **9**, 90, *pl. 161, fig. 2;* Fauna British Ind., Moths (1894), **2**, 270.

Mindanao, Camp Keithley, P. I. (7392 *Mrs. M. S. Clemens*); Luzon, Manila, P. I. (9680 *R. Werm*).

Leucania Nigrilinea Leech.
Leucania nigrilinea Leech, Proc. Zoöl. Soc. Lond. (1899), 483, *pl. 50, fig. 8.*

Luzon, Province of Benguet, Lutab, P. I., 2,250 meters (12709 *R. C. McGregor*).

PHYCIDOPSIS Hampson.

Ill. Typ. Lep. Het., British Mus. (1893); **9**, 91.
Type: *P. albovittata* Hamps.

Phycidopsis albovittata Hamps.
Phycidopsis albovittata Hamps., *loc. cit., pl. 161, fig. 13;* Fauna British Ind., Moths (1894), **2**, 288.

Luzon, Province of Benguet, Lutab, P. I. (12699 *R. C. McGregor*).

Subf. ACONTIINÆ.

EUBLEMMA Hübner.

Verz. (1816) 256.
Type: *E. respersa* Hübn.

* Eublemma versicolor Walk.
Autoba versicolor Walk., Journ. Linn. Soc. Lond. (1864), **7**, 58.
Mestleta angulifera Moore, Desc. Ind. Lep. Ins. Coll. Atk. (1879), **179**; Lep. Ceylon (1885), **3**, 208, *pl. 175, figs. 2*, 2a.
Eublemma angulifera Hamps., Fauna British Ind., Moths (1894), **2**, 343.
Eublemma versicolor Swinh., Cat. Lep., Het. (1900), **2**, 65.

Luzon, Manila, P. I. (2938 *W. Schultze*).

Subf. SARROTHRIPINÆ.

BLENINA Walker.

Cat. Lep. Het., British Mus. (1857), **13**, 1214.
Type: *B. donans* Walk.

BLENINA DONANS Walk.

Blenina donans Walk., *loc. cit.*, 1215; Moore, Lep. Ceylon (1885), **3**, 129, *pl. 160, fig. 2;* Hamps., Fauna British Ind., Moths (1894), **2**, 377.

LUZON, Manila, P. I. (9689 *R. Werm*).

BLENINA QUINARIA Moore.

Blenina quinaria Moore, Descr. Ind. Lep. Ins. Coll. Atk. (1879), 158, *pl. 5, fig. 5;* Hamps., Fauna British Ind., Moths (1894), **2**, 379.

LUZON, Manila, P. I. (9191 *M. Garcia*).

CLETTHARRA Walker.

Cat. Lep. Ins. British Mus. (1863), **27**, 101.
Type: *C. valida* Walk.

CLETTHARRA ALBONOTATA Hamps.

Clettharra albonotata Hamps., Fauna British Ind., Moths (1894), **2**, 384.

LUZON, Manila, P. I. (6388 *W. Schultze*).

Subf. STICTOPTERINÆ.

MACEDA Walker.

Cat. Lep. Het. British Mus. (1857), **13**, 1140.
Type: *M. mansueta* Walk.

MACEDA MANSUETA Walk.

Maceda mansueta Walk., *loc. cit.* 1141.
Calduba obdenta Walk., *op. cit.* (1858), **15**, 1815.
Maceda discalis Walk., Journ. Linn. Soc. Lond. (1864), **7**, 176.
Maceda mansueta Moore, Lep. Ceylon (1884), **3**, 82, *pl. 154, fig. 4*, 5; Hamps., Fauna British Ind., Moths (1894), **2**, 397.

LUZON, Manila, P. I. (9229 *R. Parás*).

GYRTONA Walker.

Cat. Lep. Het., British Mus. (1863), **27**, 89.
Type: *G. proximalis* Walk.

GYRTONA LAPIDARIA Walk.

Gyrtona lapidaria Walk., *op. cit.* (1864), **31**, 257; Hamps., Ill. Lep. Het. British Mus. (1889), **7**, pl. 143, fig. 20; Fauna British Ind., Moths (1894), **2**, 406.

LUZON, Bataan, Lamao, P. I. (6961 *H. Cuzner*).

GYRTONA HYLUSALIS Walk.

Gyrtona hylusalis Walk., Cat. Lep. Ins. British Mus. (1863), **27**, 93; Hamps., Ill. Het. British Mus. (1893), **9**, *pl. 163, fig. 18;* Fauna British Ind., Moths (1894), **2**, 405.

LUZON, Province of Benguet, Baguio, P. I. (10458 *W. Schultze*).

Subf. QUADRIFINÆ.

SYPNA Guenée.

Noct. (1852), **3**, 144.
Type: *S. omicronigera* Guen.

SYPNA PUNCTOSA Walk.

Tavia punctosa Walk., Cat. Lep. Ins. British Mus. (1865), **33**, 939.
Sypna ochreicilia Hamps., Ill. Het. British Mus. (1891), **8**, 89, *pl. 147, fig. 1.*
Sypna punctosa Hamps., Fauna British Ind., Moths (1894), **2**, 447.

LUZON, Province of Benguet, Pauai, P. I., 2,250 meters (11138 *R. C. McGregor*).

ERCHEIA Walker.

Cat. Lep. Het. British Mus. (1857), **13**, 1107.
Type: *E. cyllaria* Cram.

ERCHEIA CYLLOTA Guen.

Achaea cyllota Guen., Noct. (1852), **3**, 248.
Ercheia cyllota Moore, Lep. Ceylon (1885), **3**, 115, *pl. 157, fig. 2.*

LUZON, Manila, P. I. (2585 *W. Schultze*).

NYCTIPAO Hübner.

Verz. (1818), 271.
Type: *N. crepuscularis* Linn.

NYCTIPAO STRIGIPENNIS Moore.

Nyctipao stringipennis Moore, Proc. Zoöl. Soc. Lond. (1883), 25; Hamps., Fauna British Ind., Moths (1894), **2**, 460.

LUZON, Manila, P. I. (5086 *C. S. Banks*).

CHRYSOPERA Hampson.

Fauna British Ind., Moths (1894), **2**, 493.
Type: *C. combinans* Walk.

CHRYSOPERA COMBINANS Walk.

Achacea combinans Walk., Cat. Lep. Het. British Mus. (1858), **14**, 1399; Moore, Lep. Ceylon (1885), **3**, 165, *pl. 169, fig. 3.*
Chrysopera combinans Hamps., *loc. cit.* 493.

LUZON, Province of Tarlac, Anao, P. I. (9449 *R. C. McGregor*).

HYPÆTRA Guenée.

Noct. (1852), **3**, 259.
Type: *H. noctuoides* Guen.

HYPÆTRA NOCTUOIDES Guen.

Hypætra noctuoides Guen., *loc. cit.;* Hamps., Fauna British Ind., Moths (1894), **2**, 507.

LUZON, Manila, P. I. (4764 *E. D. Merrill*).

HYPÆTRA BUBO Hübn.

Athyrma bubo Hübn., Zutr. (1832), **4**, 13, *figs. 633, 634.*
Hypætra bubo Hamps., Fauna British Ind., Moths (1894), **2**, 508.

LUZON, Manila, P. I. (1432 *W. Schultze*).

DORDURA Moore.

Descr. Ind. Lep. Ins. Coll. Atk. (1879), 170.
Type: *D. aliena* Walk.

DORDURA ALIENA Walk.

Hypætra aliena Walk., Cat. Lep. British Mus. (1865), **33**, 964.
Dysgonia tincta Hamps., Ill. Typ. Het. British Mus. (1893), **9**, 112, *pl. 165, fig. 3.*
Dordura aliena Hamps., Fauna British Ind., Moths (1894), **2**, 511.

LUZON, Manila, P. I. (8798 *J. Guerrero*).

HAMODES Guenée.

Noct. (1852), **3**, 202.
Type: *H. propitia* Guen.

HAMODES AURANTIACA Guen.

Hamodes aurantiaca Guen., *loc. cit.* 203.
Ophisma attacicola Walk., Cat. Lep. Het. British Mus. (1858), **14**, 1383.
Hamodes attacicola Swinh., Proc. Zoöl. Soc. Lond. (1885), 463.
Hypernaria dicistriga Moore, Proc. Zoöl. Soc. Lond. (1867), 78.
Hamodes dicistriga Moore, *op. cit.* (1877), 609.
Hamodes marginata Moore, Descr. Ind. Lep. Ins. Coll. Atk. (1882), 169.
Hamodes aurantiaca Hamps., Fauna British Ind., Moths (1894), **2**, 547.

LUZON, Manila, P. I. (12683 *C. S. Banks*).

ENMONODIA Walker.

Cat. Lep. Het. British Mus. (1858), **14**, 1332.
Type: *E. pudens* Walk.

ENMONODIA PUDENS Walk.

Hypopyra pudens Walk., *loc. cit.* 1329.
Spirama pudens Hamps., Fauna British Ind., Moths (1894), **2**, 555.
Enmonodia pudens Butl., Entom. (1893), **26**, 353.
Enmonodia hypopyroides Walk., *loc. cit.*, 1333.
Hypopyra grandæva Feld., Reise Nov., Lep. (1873), *pl. 115, fig. 2.*
Hypopyra persimilis Moore, Proc. Zoöl. Soc. Lond. (1877), 608.

LUZON, Province of Laguna, Los Baños, P. I. (12902 *E. M. Ledyard*).

Fam. EPIPLEMIDÆ.

ORUDIZA Walker.

Cat. Lep. Ins. British Mus. (1861), **23**, 857.
Type: *O. protheclaria* Walk.

ORUDIZA PROTHECLARIA Walk.

Orudiza protheclaria Walk., *loc. cit.* 858; Hamps., Fauna British Ind., Moths (1895), **3**, 124.

LUZON, Province of Bataan, Lamao, P. I. (9149 *W. Schultze*).

Fam. GEOMETRIDÆ.

Subf. BOARMIINÆ.

ORZONOBA Walker.

Cat. Lep. Het. British Mus. (1860), **20**, 218.
Type: *O. clelia* Cram.

ORZONOBA CLELIA Cram.

Phalæna clelia Cram., Pap. Exot. (1782), **3**, 172, *pl. 288, figs. B, C.*
Orzonoba clelia Moore, Lep. Ceylon (1887), **3**, 395, *pl. 187, fig. 2;* Hamps., Fauna British Ind., Moths (1895), **3**, 212.

LUZON, Manila, P. I. (7138 *W. Schultze*).

APLOCHLORA Warren.

Proc. Zoöl. Soc. Lond. (1893), 386.
Type: *A. vivilaca* Walk.

APLOCHLORA VIRIDIS Warren.

Aplochlora viridis Warren, *loc. cit., pl. 31, fig. 7.*

LUZON, Province of Benguet, Pauai, P. I., 2,250 meters (11372 *R. C. McGregor*).

Subf. LARENTIINÆ.

PHOTOSCOTOSIA Warren.

Proc. Zoöl. Soc. Lond. (1888), 328.
Type: *P. miniosata* Walk.

PHOTOSCOTOSIA MINIOSATA Walk.

Scotosia miniosata Walk., Cat. Lep. Het. British Mus. (1862), **25**, 1354.
Photoscotosia miniosata Hamps., Fauna British Ind., Moths (1895), **3**, 380.

LUZON, Province of Benguet, Pauai, P. I., 2,250 meters (11134 *R. C. McGregor*).

CATACLYSME Hübner.

Verz. bek. Schmetterl. (1818), 329.
Type: *C. riguata* Hübn.

CATACLYSME CONTURBATA Walk.

Larentia conturbata Walk., Cat. Lep. Ins. British Mus. (1862), **26**, 1703.
Cataclysme conturbata Hamps., Fauna British Ind., Moths (1895), **3**, 349.

LUZON, Province of Benguet, Pauai, P. I., 2,250 meters (11379 *R. C. McGregor*).

PHTHONOLOBA Warren.

Nov. Zoöl. (1894), **1**, 397.
Type: *P. decussata* Moore.

PHTHONOLOBA DECUSSATA Moore.

Phthonoloba decussata Moore, Proc. Zoöl. Soc. Lond. (1867), 655, *pl. 33, fig. 10.*

NEGROS, Mount Canlaon, 850 meters (6448 *C. S. Banks*).

Subf. ACIDALIINÆ.

ACIDALIA Treitschke.

Eur. Schmetterl. (1825), **5**, 438.
Type: *A. ochrata* Scop.

*ACIDALIA RUFULA Swinh.
Acidalia rufula Swinh.

LUZON, Manila, P. I. (3506 C. S. Banks).

Subf. GEOMETRINÆ.

DYSPHANIA Hübner.

Verz. (1816), 175.
Type: *D. militaris* Linn.

DYSPHANIA PALMYRA Stoll.
Phalæna Bombyx palmyra Stoll, Cram. Pap. Exot. (1790), **5**, 159, *pl. 36, fig. 1.*
Euschema palmyra Hübn., Verz., (1816), 175; Hamps., Fauna British Ind., Moths (1895), **3**, 470.
Euschema transversa Moore, Lep. Ceylon (1887), **3**, 422, *pl. 189, figs. 3, 3a.*
Dysphania palmyra Swinh., Cat. Lep. Het. (1900), **2**, 381.

PALAWAN, Iwahig, P. I. (9445 *C. M. Weber,* 11106 *W. Schultze*).

AFRENA Hampson.

Trans. Ent. Soc. Lond. (1895), 314.
Type: *A. esmeralda* Hamps.

AFRENA ESMERALDA Hamps.
Afrena esmeralda Hamps., Trans. Ent. Soc. Lond. (1895), 314; Fauna British Ind., Moths (1896), **4**, 565.

LUZON, Manila, P. I. (11545 *W. Schultze*).

Fam. PYRALIDÆ.

Subf. ANERASTIINÆ.

ANERASTIA Hübner.

Verz. (1816), 367.
Type: *A. lotella* Hübn.

*ANERASTIA CELSELLA Walk.
Anerastia celsella Walk., Cat. Lep. British Mus. (1863), **27**, 193; Hamps., Fauna British Ind., Moths (1896), **4**, 56.

LUZON, Manila, P. I. (3831 *C. S. Banks*).

* ANERASTIA PALLIDICOSTA Walk.
Pempelia cautella Walk., Cat. Lep. British Mus. (1863), **27**, 73.
Cadra defectella Walk., *op. cit.* (1864), **30**, 962.
Ephestia cautella Hamps., Fauna British Ind., Moths (1896), **4**, 66.

LUZON, Manila, P. I. (117, 3828, 3876 *C. S. Banks*).

NEPHOPTERYX Hübner.

Verz. (1816), 370.
Type: *N. rhenella* Zinck.

NEPHOPTERYX SYNTARACTIS Turn.
Nephopteryx syntaractis Turner, Proc. Roy. Soc. Queensl. (1904), **18**, 145.

LUZON, Manila, P. I. (4169 *C. S. Banks*).

CANTHELEA Walker.

Cat. Lep. British Mus. (1866), **35**, 1726.
Type: *C. ægnusalis* Walk.

* CANTHELEA ÆGNUSALIS Walk.
Pyralis?ægnusalis Walk., *op. cit.* (1859), **19**, 905.
Homœosoma gratella Walk., *op. cit.* (1863), **27**, 26.
Homœsoma derascella Swinh., Proc. Zoöl. Soc. Lond. (1885), 877, *pl. 57, fig. 19.*
Epicrocis ægnusalis Hamps., Fauna British Ind., Moths (1896), **4**, 85.

LUZON, Manila, P. I. (2376, 2632 *C. S. Banks*).

PHYCITA Curtis.

British Ent. (1840), **6**, 233.
Type: *P. spissicella* Fabr.

*PHYCITA PROXIMALIS Walk.
Nephopteryx proximalis Walk., Cat. Lep. British Mus. (1863), **27**, 68.
Phycita proximalis Hamps., Fauna British Ind., Moths (1896), **4**, 94.

LUZON, Manila, P. I. (5864 *C. S. Banks*).

*PHYCITA CLIENTELLA Zell.
Nephopteryx clientella Zell., Stett. Ent. Zeit. (1867), 396.
Phycita clientella Hamps., Fauna British Ind., Moths (1896), **4**, 94.

LUZON, Manila, P. I. (2628 *C. S. Banks;* 5246 *W. Schultze*).

RHODOPHÆA Guenée.

Eur. Microl. Ind. Meth. (1845), 74.
Type: *R. advenella* Zinck.

*RHODOPHÆA HERINGII Rag.
Rhodophœa heringii Rag., Ann. Soc. Ent. France (1888), 282; Hamps., Fauna British Ind., Moths (1896), **4**, 99.

LUZON, Manila, P. I. (2631 *C. S. Banks*).

Subf. ENDOTRICHINÆ.

ENDOTRICHA Zeller.

Iris (1847), 293.
Type: *E. flammealis* Schiff.

*ENDOTRICHA PUNCTICOSTALIS Walk.
Rhisina puncticostalis Walk., Cat. Lep. British Mus. (1865), **34**, 1324.

LUZON, Manila, P. I. (4176 *C. S. Banks;* 4244 *Geo. L. Araneta*).

Subf. PYRALINÆ.

PYRALIS Linnæus.

Syst. Nat. (1767), **12**, 881.
Type: *P. farinalis* Linn.

*PYRALIS PICTALIS Curt.

Asopia pictalis Curt., British Ent. (1834), **11**, pl. 527.
Pyralis pronœalis Walk., Trans. Ent. Soc. Lond. (1859), **19**, 906.
Pyralis proximalis Walk., Trans. Ent. Soc. Lond. (1864), 120.
Myelois bractiatella Walk., Cat. Lep. British Mus. (1863), **27**, 36; Moore, Lep. Ceyl. (1887), **3**, 262, *pl. 178, fig. 3.*

LUZON, Manila, P. I. (2592 *C. S. Banks*).

Subf. HYDROCAMPINÆ.

NYMPHULA Schrank.

Fauna Boica (1802), **2**, 162.
Type: *N. nymphœata* Linn.

*NYMPHULA TURBATA Butl.

Nymphula turbata Butl., Trans. Ent. Soc. Lond. (1881), 586; Hamps., Fauna British Ind., Moths (1896), **4**, 192.

LUZON, Manila, P. I. (2934 *W. Schultze*, 4172 *C. S. Banks*, 5898 *G. M. Nell*).

MUSOTIMA Meyrick.

Trans. Ent. Soc. Lond. (1884), 288.
Type: *M. anducalis* Feld.

*MUSOTIMA SUFFUSALIS Hamps.

Musotima suffusalis Hamps., Ill. Lep. Het. British Mus. (1893), **9**, 178, *pl. 174, fig. 20;* Fauna British Ind., Moths (1896), **4**, 199.

LUZON, Manila, P. I. (5884 *G. M. Nell*).

ORPHNOPHANES Lederer.

Wien. Ent. Mon. (1863), 428.
Type: *O. eucerasalis* Walk.

*ORPHNOPHANES ALBISIGNALIS Hamps.

Orphnophanes albisignalis Hamps., Fauna British Ins., Moths (1896), **4**, 231.

LUZON, Province of Benguet, Trinidad, P. I. (8688 *C. S. Banks*).

Subf. MARGARONIINÆ.

LOMOTROPA Lederer.

Wien. Ent. Mon. (1863), **7**, 404.
Type: *L. costiflexalis* Guen.

LOMOTROPA COSTIFLEXALIS Guen.

Pygospila costiflexalis Guen., Delt. et Pyral. (1854), 313; Hamps., Fauna British Ind., Moths (1896), **4**, 362.
Lomotropa costiflexalis Led., l. c. 405, *pl. 14, fig. 8.*

LUZON, Manila, P. I. (3549 *R. E. Brown, S. J.*).

Subf. PYRAUSTINÆ.

OMPHISA Moore.

Lep. Ceylon (1886), **3**, 317.
Type: *O. anastomosalis* Guen.

OMPHISA ANASTOMOSALIS Guen.

Pionea anastomosalis Guen., Delt. et Pyral. (1854), 373.
Omphisa anastomosalis Hamps., Fauna British Ind., Moths (1896), **4**, 382; Swinh., Cat. Lep., Het. (1900), **2**, 521.

LUZON, Manila, P. I. (8049 *C. S. Banks*).

CHROCHIPHORA Hübner.

Geyer, Samml., Exot. Schmetterl. (1838), **4**, 12.
Type: *C. testulalis* Hubn.

CHROCHIPHORA TESTULALIS Hubn.

Chrochipora testulalis Hubn., *loc. cit.*, figs. 629, 630.
Stenia testulalis Guen., Delt. et Pyral. (1854), 230.
Siriocauta testulalis Led., Wien. Ent. Mon. (1863), **7**, 424.
Maruca testulalis Moore, Lep. Ceylon (1885), **3**, 298; Hamps., Fauna British Ind., Moths (1896), **4**, 393.

LUZON, Manila, P. I. (9757 *R. Werm*).

ACHARANA Moore.

Lep. Ceylon. (1885), **3**, 285.
Type: *A. phaeopteralis* Guen.

ACHARANA LICARSISALIS Walk.

Botys licarsisalis Walk., Cat. Lep. Het., British Mus. (1859), **18**, 686.
Pachyzancla licarsisalis Hamps., Fauna British Ind., Moths (1896), **4**, 402.
Acharana licarsisalis Swinh., Cat. Lep., Het. (1900), **2**, 526.

LUZON, Manila, P. I. (3124, 3926, 4323, 4727, *W. Schultze*).

Fam. TINEIDÆ.

MICROCOSSUS Moore.

Lep. Ceylon (1885), **3**, 497.
Type: *M. mackwoodii* Moore.

MICROCOSSUS MACKWOODII Moore.

Microcossus mackwoodii Moore, *loc. cit.*, 498, *pl. 208, fig. 9.*

LUZON, Manila, P. I. (4757, 8047 *W. Schultze*).

ILLUSTRATIONS.

PLATE I.

FIG. 1. Adlullia samarensis Schultze ♀.
2. Pseudoganisa currani Schultze ♂.
3. Deilemera gratia Schultze ♀.
4. Numenes insolita Schultze ♂.
5. Phthonoloba benguetana Schultze ♀.
6. Adlullia benguetana Schultze ♂.
7. Adlullia benguetana Schultze ♀.
8. Hyperperissa pulchella Schultze ♀.
9. Tarucus leopardus Schultze ♂ (underside).
10. Monotaxis montanus Schultze ♀.

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J. Castro, ad nat. del. 1910.

PLATE I.

NEUE COLEOPTERA LAMELLICORNIA VON DEN PHILIPPINEN.

Von J. Moser.

(*Berlin, Germany.*)

Die im folgenden beschriebenen Arten befanden sich unter dem Material, welches mir das Bureau of Science in Manila zur Bestimmung übersandte, und wurden mir von diesen Arten Doubletten gütigst überlassen.

Macronota luctuosa Voll., subsp. **palawanica** subsp. nov.

Differt a *luctuosa* Voll.: Minor, clyper femoribus tibiisque rufis.—Long. 17 mill.

Typus No. 10725 in Coll. Ent., Bureau of Science, Manila, P. I.

Hab: Palawan, Iwahig, P. I. (*W. Schultze* collector).

Auf Palawan kommt eine kleine Lokalform der *Macronota luctuosa* Voll., vor. Die Exemplare von Amboina, Sumatra und Nias sind von gleicher Grösse. Während jedoch bei den Exemplaren von Sumatra und Nias, Clypeus und Fühler schwarz sind, sind bei solchen von Amboina der Clypeus und Fühler rotbraun. Auch zeigen bei einigen Exemplaren von letzterer Lokalität die Beine eine pechbraune Färbung. Exemplare von Palawan sind nun bedeutend kleiner und sind bei ihnen der vordere Teil des Clypeus, die Fühler, Schenkel und Schienen rotbraun gefärbt.

Astræa multimaculata sp. nov.

Nigra, supra opaca flavomaculata. Capite punctato, fronte flavo-bivittata, clypeo nitido, antice emarginato; antennis piceis; prothorace disco sparsim lateraliter paulo densius punctato, vittis 5 maculisque 2 an 4 flavis ornato; scutello vitta media flava; scapulis flavis; elytris disco striatis lateraliter aciculato-punctatis, singulis maculis 13–15 flavis ornatis; pygidio flavo, nigro-bivittato, aciculato-punctato, punctis setas minutas flavas ferentibus. Corpore infra medio nitido, lateribus flavo-tomentosis.—Long. 11 mill.

Typus No. 7294 in Coll. Ent., Bureau of Science, Manila, P. I.

Hab: Mindanao, Camp Keithley, P. I. (*Mrs. M. S. Clemens* collector).

Die Art, von der zwei männliche Exemplare vorliegen, ist etwas kleiner als *A. tigrina* Mohn., hat dieselbe Zeichnung des Halsschildes aber

zahlreichere gelbe Flecke auf den Flügeldecken. Der glänzende Clypeus ist vorn in der Mitte bogenförmig ausgeschnitten, die Lappen sind abgerundet; Scheitel und Stirn sind matt und mit zwei gelben Längsbinden versehen. Die Fühler sind pechbraun. Das Halsschild hat fünf gelbe Längsbinden, von denen die mittlere weder den Vorder-noch den Hinterrand erreicht, während die vier übrigen, vom Vorderrande ausgehend, hinten verkürzt sind. Vor dem Hinterrande befindet sich jederseits des Schildchens ein gelber Makel und bei dem einen Exemplar ist auch ein kleiner punktförmiger Fleck zwischen den beiden äusseren Binden vorwärts der Mitte vorhanden. Der Discus des Halsschildes zeigt nur eine zerstreute und schwache Punktierung, während die Punkte an den Seiten etwas dichter stehen und hier hufeisenförmig sind. Das Schildchen trägt eine gelbe Längsbinde. Die Flügeldecken zeigen auf dem Discus neben der Naht drei nach vorn und hinten verschwindende Längsnadelrisse und daneben nach dem Aussenrande zu Reihen von nadelrissigen Punkten. Die Naht ist nicht wie bei *tigrina* in eine Spitze ausgezogen. Jede Flügeldecke trägt 13–15 gelbe Flecke, von denen 8 ungefähr an derselben Stelle stehen wie bei *tigrina*, aber eine mehr quere Gestalt haben, während die übrigen, kleineren, auf dem Discus neben der Naht liegen. Das gelb tomentierte Pygidium trägt zwei schwarze Längsbinden. Es hat eine zerstreute hufeisenförmige Punktierung und ist jeder Punkt mit einem gelblichen Börstchen versehen. Die Unterseite ist in der Mitte glänzend und mit vereinzelten Punkten besetzt. Die Seiten sind breit gelb tomentiert und zeigen sich auf dem Abdomen in dieser Tomentbedeckung an jeder Seite drei quere schwarze unbedeckte Flecke. Bei dem einen der beiden vorliegenden Exemplare stehen diese schwarzen Flecken auf dem dritten und vierten Bauchsegment mit der schwarzen Mitte in Verbindung. Die Seiten der Brust sind mit nicht dicht stehenden gelben Haaren besetzt, während die weitläufigen nadelrissigen Punkte des Abdomens kleine gelbliche Borsten tragen. Der Brustfortsatz ist kurz, vorn breit gerundet. Die Vorderschienen sind beim ♂ zweizähnig, die inneren Sporen der Hinterschienen sind bei den vorliegenden beiden Exemplaren nicht länger als die äusseren. Der Forceps ist ganz anders gebildet als bei *tigrina*.

Hoplia philippensis sp. nov.

Rufo-picea, dense aureo-squamulata et sparsim flavo-pilosa. Clypeo leviter coriaceo, nitido, postice punctis grossis setiferis tecto; tibiis anticis tridentatis, antennis 9-articulatis.—Long. 5.5 mill.

Typus No. 6026 in Coll. Ent., Bureau of Science, Manila, P. I.

Hab: Negros Occidental, Maao, P. I. (*Charles S. Banks* collector).

Die Art gehört zur *aurantiaca*-Gruppe. Sie ist von rotbrauner Färbung und dicht mit goldigen Schuppen bedeckt. Der Clypeus its unbeschuppt, schwach lederartig glänzend, im hinteren Teile mit sehr groben gelblich beborsteten Punkten. Sämmtliche Schuppen sind von

rundlicher Gestalt und unterscheidet sich die Art dadurch leicht von der gleichfalls auf den Philippinen vorkommenden *simplex* Sharp, bei der die Schuppen der Flügeldecken länglich geformt sind. Die kurzen gelblichen Borstenhaare der Flügeldecken stehen in regelmässigen Reihen und zwar fehlt da, wo sich ein Borstenhaar befindet, die Schuppe. In Gestalt und Form der Schuppen hat die Art Ähnlichkeit mit *aurifera* Brnsk. von Borneo, doch sind bei letzterer Art die Vorderecken des Halsschildes stärker vorgezogen und spitzwinklig, bei *philippensis* rechtwinklig.

Hoplia maculifera sp. nov.

Picea, supra dense flavo-squamosa, vittis duabus maculisque nonnullis elytrorum nigro-brunneis, subtus dense aureo-squamulata. Clypeo haud squamoso, subrugoso; tibiis anticis tridentatis, antennis 9-articulatis.—Long. 7 mill.

Typus No. 7225 in Coll. Ent., Bureau of Science, Manila, P. I.

Hab: Luzon, Province of Benguet, Irisan River, P. I. (*R. C. McGregor* collector).

Etwas grösser als die vorhergehende Art, die Form der Schuppen und die borstenartige Behaarung ebenso, aber die Schuppen anders gefärbt, der Clypeus runzelig, so dass die grösseren beborsteten Punkte nicht hervortreten wie bei der vorhergehenden Art. Die Schuppen der Oberseite sind heller oder dunkler gelb gefärbt, die Zeichnungen sind mehr oder weniger dunkelbraun. Auf dem Halsschilde befinden sich in der Mitte zwei Längsbinden und sind ausserdem noch zwei äussere angedeutet. Auf den Flügeldecken befindet sich ein Längsfleck unterhalb der Schulter, einer auf dem Discus vor der Mitte und ein fast nierenförmiger hinter der Mitte. Die Schuppen der Unterseite schimmern schwach goldig. Wegen des anders skulptierten Clypeus glaube ich nicht, dass diese Art nur eine Varietät der vorhergehenden ist, wenn gleich auch die Arten der *aurantiaca*-Gruppe ähnlich gefärbte Varietäten zu bilden pflegen.

Lepidiota corpulenta sp. nov.

♀ castanea, supra nitida, parce flavo-squamulata. Capite, fronte sparsim fortiter punctulata, clypeo lateribus rotundatis, margine antico haud exciso, ruguloso-punctato, punctis omnibus flavo-squamosis; antennis 9-articulatis; prothorace antice et postice attenuato, angulis posticis obtusis, anticis fere rectis, paulo prominulis, haud dense fortiter et ruguloso-punctato, punctis squamas minutas ferentibus; scutello semicirculari, parce punctulato; elytris subcostatis, rugoso-punctatis, punctis squamulatis, sutura lævi; pygidio densius cinereo-squamulato-setoso. Subtus pectoris lateribus griseo-villosis, abdominis medio sparsim, lateribus dense cinero-squamulatis; tibiis anticis tridentatis.—Long. 26 mill.

Typus No. 6883 in Coll. Ent., Bureau of Science, Manila, P. I.

Hab: Mindanao, Camp Keithley, P. I. (*Mrs. M. S. Clemens* collector); Cebu (7431 *A. Celestino*).

Die Art, von der drei weibliche Exemplare vorliegen, gehört zu den kleineren Arten der Gattung Lepidiota, ist von robuster Gestalt und durch neungliedrige Fühler ausgezeichnet. Die Färbung ist braun, die Oberseite ist glänzend und mit nicht dicht stehenden kleinen gelblichen Schüppchen bedeckt. Die Stirn ist kräftig aber zerstreut, der Clypeus grob runzelig punktiert, alle Punkte tragen gelbe borstenartige Schuppen. Das dritte Fühlerglied ist um die Hälfte länger als das vierte. Das Halsschild ist bedeutend breiter als lang, in der Mitte am breitesten, die Hinterecken sind stumpfwinklig, die schwach vorgezogenen Vorderecken fast rechtwinklig. Die Oberfläche ist ebenso wie die des Schildchens nicht dicht aber grob runzelig punktiert und jeder Punkt mit einem kleinen gelblichen Schüppchen versehen. Die Flügeldecken zeigen ausser der glatten, schwach erhabenen Naht, noch 2–3 Rippen, welche sich schwach von der runzlig punktierten und mit kleinen Schuppen versehenen Oberfläche abheben. Das Pygidium ist dichter nadelrissig punktiert und weisslich beschuppt. Die Seiten der Brust sind gelblichgrau behaart, die Mitte der Brust zeigt nur vereinzelte grobe Punkte. Die Mitte des Abdomens ist zerstreut punktiert, die Seiten sind dicht mit borstenartige weissliche Schuppen tragenden Punkten bedeckt. Die Beine sind weiss beborstet, die Vorderschienen dreizähnig.

Apogonia metallescens sp. nov.

Nigro-brunnea, nitida, supra vividi et cupreomicans. Capite haud dense punctulato, clypea antice parum emarginato, fortius punctato; antennis piceis; prothorace transverso, angulis posticis rotundatis, angulis anticis prominulis, acutis, disco haud crebre, lateraliter paulo densius punctato et leviteo impresso; scutello dere lævi; elytris postice paulo ampliatis, subrugoso-punctatis, vix costatis; pygidio ruguloso-punctato. Subtus medio subtiliter et sparsim, lateraliter densius et fertius umbilicato-punctata, tibiis anticis bidentatis.—Long. 10–11 mill.

Typus No. 6901 in Coll. Ent., Bureau of Science, Manila, P. I.

Hab.: Mindanao, Camp Keithley, P. I. (*Mrs. M. S. Clemens* collector).

In Grösse und Gestalt der *A. major* Waterh., von Japan ähnlich, die Flügeldecken jedoch ohne deutliche Rippen. Die Färbung ist schwarzbraun, die Oberseite metallisch grün, teilweise auch kupfrig schimmernd. Die Stirn ist nicht dicht, der Clypeus dichter und etwas gröber punktiert, vorn flach ausgerandet. Das Halsschild ist mehr als doppelt so breit wie lang, die Vorderecken sind etwas vorgezogen, die Hinterecken breit abgerundet; der Discus ist bei dem einen der beiden vorliegenden Exemplare zerstreut, bei dem anderen mässig dicht punktiert; neben den Seitenrändern stehen die Punkte etwas dichter und sind gröber und findet sich hier ein flacher Eindruck. Das Schildchen ist bei dem einen Exemplar ganz glatt, bei dem anderen trägt es einige sehr schwache Punkte. Die Flügeldecken zeigen nur bei schräger Betrach-

tung schwache Andeutungen von drei Rippen. Sie sind mässig dicht runzelig punktiert, nach den Seiten hin gröber und hier querrunzelig. Das Pygidium zeigt eine sehr kräftige runzelige Punktierung. Unterseits ist die Mitte nur zerstreut und fein punktiert, während an den Seiten die Punkte dichter stehen, gröber sind und äusserst kleine, nur mit der Lupe sichtbare Börstchen tragen. Die Vorderschienen sind zweizähnig.

Apogonia nigrobrunnea sp. nov.

Nigro-brunnea, nitida. Capite sat crebre punctato, clypeo brevi, antice subtruncato, ruguloso-punctato; antennis rufis; prothorace transverso, sat dense punctato, lateraliter leviter impresso, angulis posticis rotundatis, angulis anticis paulo prominulis, fere rectis; scutello linea media laevi; elytris postice parum ampliatis, disco subtiliter, lateraliter paulo fortius punctatis, subtricostatis; pygidio dense et fortiter punctato, subcarinato. Subtus medio sparsim, lateraliter densius punctata, punctis setas minutas ferentibus; tibiis anticis tridentatis.—Long. 12 mill.

Typus No. 991 in Coll. Ent., Bureau of Science, Manila.

Hab: Luzon, Province of Benguet, Irisan River, P. I. (*R. C. McGregor* collector).

In Gestalt der vorigen Art ähnlich von schwarzbrauner Färbung, stark glänzend, metallisch schimmernd. Der Kopf ist mässig dicht, an der Clypeusnaht weitläufiger punktiert, der Clypeus ist vorn fast gerade abgestutzt und grob, beinahe runzelig punktiert. Die Fühler sind rotgelb. Das Halsschild ist sehr quer, mässig dicht, auf den Seiten etwas runzelig punktiert, jederseits neben den Seitenrändern mit schwachem Eindruck. Die Hinterecken sind breit abgerundet, die etwas vorgezogenen Vorderecken beinahe rechtwinklig. Das Schildchen lässt eine glatte Mittellinie erkennen. Die nach hinten schwach erweiterten Flügeldecken sind etwas weitläufiger punktiert als das Halsschild. Auf dem Discus sind die Punkte schwach, an den Seiten etwas kräftiger. Ausserdem erscheinen die Flügeldecken schwach quergerunzelt. Die drei Rippen sind sehr undeutlich, die erste verbreitert sich nach hinten. Das Pygidium ist sehr grob punktiert und trägt in der Mitte einen undeutlichen Längskiel. Die Unterseite zeigt in der Mitte zerstreute, an den Seiten dichter stehende Punkte und ist jeder Punkt mit einem sehr kleinen gelblichen Börstchen versehen. Die Vorderschienen sind kräftig dreizähnig.

Apogonia viridana sp. nov.

Convexa, viridis, nitida; antennis, pygidio pedibusque brunneis. Capite, fronte fortiter punctulata, clypeo antice truncato, ruguloso-punctato; prothorace longitudine duplo latiore, sparsim punctato, angulis posticis obtusis, subrotundatis, angulis anticis fere rectis, paulo prominulis; scutello fere laevi; elytris subrugoso-punctatis, indistincte bicostatis; propygidio pygidioque fortiter ruguloso-punctatis, punctis squami-

feris. Corpore infra medio sparsim punctato, lateribus sat dense flavo-squamosis; tibiis anticis bidentatis.—Long. 7 mill.

Typus No. 10660 in Coll. Ent., Bureau of Science, Manila, P. I.

Hab: Luzon, Cagayan, Camalaniogan, P. I. (*H. M. Curran* collector).

Eine kleinere gewölbte Art, grün, glänzend, Fühler, Propygidium, Pygidium und Beine braun, Halsschild und Kopf bei dem einen der beiden vorliegenden Exemplare etwas kupferig. Die Stirn ist mässig dicht *mit* tiefen Punkten bedeckt, der vorn fast gerade abgestutzte Clypeus ist dicht, fast runzelig punktiert. Das Halsschild trägt nur eine zerstreute Punktierung, die stumpfen Hinterecken sind fast abgerundet, die etwas vorgezogenen Vorderecken ungefähr rechtwinklig. Das Schildchen ist bei dem einen der beiden Exemplare ganz glatt, bei dem anderen sind einige schwache Punkte erkennbar. Die Flügeldecken sind zwar nicht sehr dicht aber grob und namentlich nach den Seitenrändern zu runzelig punktiert. Zwei Rippen auf dem Discus treten nur wenig hervor, die Naht ist fast glatt, neben den Seitenrändern befinden sich fünf regelmässige Punktreihen. Propygidium und Pygidium sind mit groben Punkten bedeckt, so dass sie stark runzelig erscheinen. Jeder dieser Punkte trägt ein kleines gelbes Schüppchen. Die Mitte der Brust ist zerstreut punktiert, die Bauchsegmente zeigen in der Mitte eine Querreihe von beborsteten Punkten, die Seiten der Brust und des Abdomens sind ziemlich dicht mit gelblichen Schuppen bedeckt. Die Vorderschienen sind zweizähnig.

Die Art scheint der mir unbekannten *A. magnifica Rits.* nahe zu stehen, doch ist diese grösser und hat dreizähnige Vorderschienen.

Apogonia lutea sp. nov.

Elongata, lutea, nitida, capite thoraceque obscurioribus. Fronte haud dense punctulata, clypeus antice parum emarginato, fortiter punctato; antennis testaceis; prothorace valde transverso, disco sparsim versus margines laterales densius punctato, angulis posticis rotundatis, angulis anticis prominulis; scutello laevi; elytris haud crebe fortiter punctatis, disco bicostatis, sutura costique fere laevibus; pygidio sparsim punctato, punctis in posteriore parte flavo-pilosis. Subtus medio fere laevi, lateribus fortiter haud dense punctatis, punctis setas minutas ferentibus; tibiis anticis tridentatis.—Long. 9 mill.

Typus No. 7223 in Coll. Ent., Bureau of Science, Manila, P. I.

Hab: Luzon, Province of Benguet, Irisan River, P. I. (*R. C. McGregor* collector).

Von länglicher Gestalt, nach hinten schwach verbreitert schmutzig gelb, Kopf, Halsschild, Schienen und Tarsen bräunlich. Die Stirn ist mässig dicht mit ziemlich kräftigen Punkten besetzt, der vorn schwach ausgerandete Clypeus trägt eine sehr grobe Punktierung, so dass er fast runzlig erscheint. Das Halsschild ist auf dem Discus weitläufig, nach

den Seiten zu enger punktiert, die Hinterecken sind abgerundet, die Vorderecken etwas vorgezogen. Die Flügeldecken zeigen auf dem Discus eine unregelmässige, ziemlich grobe Punktierung und markieren sich zwei Rippen dadurch, dass sie ebenso wie die Naht fast punktfrei sind und von Punktreihen begrenzt werden. Neben den Seitenrändern der Flügeldecken befinden sich mehrere regelmässige Punktreihen. Das Pygidium zeigt eine weitläufige Punktierung und tragen die Punkte im hinteren Teile abstehende gelbe Haare. Die Unterseite ist in der Mitte fast glatt, dagegen findet sich an den Seiten eine kräftige aber nicht besonders dichte Punktierung; die Punkte sind mit kleinen gelblichen Börstchen besetzt. Die Vorderschienen sind dreizähnig.

Apogonia rugipennis sp. nov.

Elongata, fusca, nitida, flavo-pilosa. Capite rugoso-punctato, clypeo antice emarginato; prothorace transverso, sat dense fortiter subrugulosopunctato, angulis posticis rotundatis, angulis anticis fere rectis, vix prominulis; scutello dense punctato; elytris rugoso-punctatis, indistincte bicostatis; pygidio conico, fortiter et profunde punctato. Subtus sat dense punctata; tibiis anticis tridentatis.—Long. 9 mill.

Typus No. 7235 in Coll. Ent., Bureau of Science, Manila, P. I.

Hab: Luzon, Province of Benguet, Irisan River, P. I. (*R. C. McGregor* collector).

Von länglicher Gestalt, unten heller oben dunkler braun, das Halsschild und der Kopf, mit Ausnahme des Clypeus, schwach grün metallisch schimmernd. Die ganze Oberseite und Unterseite sind mit sehr feinen, nicht dicht stehenden Härchen bedeckt, welche auf der Unterseite anliegen, auf der Oberseite schwach aufgerichtet sind. Der Kopf ist sehr runzelig punktiert, der Clypeus vorn ausgerandet. Das Halsschild zeigt eine grobe Punktierung, die Zwischenräume zwischen den Punkten sind schwach runzelig; die Hinterecken sind abgerundet, die fast rechtwinkligen Vorderecken kaum vorgezogen. Das Schildchen ist auf der ganzen Fläche punktiert. Auf den grob und runzelig punktierten Flügeldecken markieren sich zwei Rippen nur sehr undeutlich. Das Pygidium ist stumpf kegelförmig und trägt sehr grosse und tiefe Punkte. Die ganze Unterseite ist ziemlich dicht punktiert, nur auf der Mitte der Brust stehen die Punkte etwas weitläufiger. Die Vorderschienen tragen drei Zähne, von denen die beiden untersten sehr kräftig sind.

FILIPINO EARS, II: EARS FROM THE MALECON MORGUE.

By Robert Bennett Bean.

(*From the Anatomical Laboratory, Philippine Medical School.*)

The ears of all the unclaimed bodies that remained in the Manila City Morgue during a short period of time are presented here in three plates to illustrate the Primitive, the Iberian, and various forms of blended ears. The individuals represent a small section of a random sample of the lower strata of Manila's population. There are in all 19 adult male and 7 adult female Filipinos and 1 adult male Russian. A table containing the stature, cephalic index and nasal index of the subjects is given so that the physical characteristics of the individual may be compared with the ear type.

The Iberian ears are shown in Plate I. The ears in the upper row are Iberian Type A; those in the middle row are Iberian Type B; and those in the lower row are Iberian Type D. The most characteristic ear of each type is placed on the left; the others are modified forms. Photographs of both the right and left ear of each subject are reproduced in two positions: First, the side view of each; then the right ear from behind and the left ear from in front.

Detailed descriptions are unnecessary, but a few salient facts may be mentioned. The essential characteristics of the Iberian ear are seen in the inversion of the concha and the rolling out of the helix. This gives a shallow bowl in the concha and a flat helix below. The whole ear assumes a flat appearance and is usually placed parallel to the head rather than at right angles. The rim of the helix is shaped like the italic letter *f* or the old English or German *ff*, which can be seen when the ear is looked at from behind. The ear is thin, the lines of the skin are fine, and the skin is smooth in appearance, but harsh to the touch.

The Modified Primitive ears of Plate II are arranged in the order of increasing modification from the upper left-hand corner to the lower right-hand corner of the plate. The Primitive ear is characterized by inversion of the concha and rolling in of the helix. The upper and lower parts of the latter project in the formation of a shelf. The concha is deep and resembles a bowl. Viewed from behind, the flat dorsal surface

of the bowl may be seen, and the upper part of the helix and the lower part of the lobule appear to be the lips of the bowl. The ear is thick, the skin lines are coarse, and the skin is rough in appearance, but feels like velvet.

Ear No. 87 is notable because it was removed from the head of a Russian; on the right it is Modified Iberian, whereas on the left it is Modified Primitive. The physical characteristics of this individual resemble the Blends, moderately brachy-cephalic, leptorrhine and tall. The man was no doubt a mixture of the Iberian from Europe and the Primitive from Siberia.

Plate III represents ears that appear to be fused Iberian and Primitive. In each ear there are characteristics of both, but they are different from either, and the physical characteristics are those of the Australoid type. It may also be worthy of note that the physical characteristics of the individuals with the modified Iberian ears of Plate I are largely Iberian and the physical characteristics of the individuals with the Modified Primitive ears of Plate II are largely Primitive.

The cephalic index is not so good a criterion of type as the ear form, because it is seen that the average cephalic index of the subjects with Iberian characteristics is almost as great as that of those with Primitive markings. The nasal index for the same reason is a better indicator than the stature. Stature and cephalic index may be so altered by the environment as to become of no service in the determination of type; therefore, other factors should be emphasized for this purpose. The ear form and the nasal index are more stable and less influenced by environment; therefore they are better factors than the other two.

TABLE I.—(*See* PLATE I.)

Type.	No.	Cephalic index.	Nasal index.	Stature.
Iberian	93	78.0	86.0	151.0 ♀
B. B. B	94	88.4	71.4	170.8 ♂
Blend	96	83.3	80.0	166.8 ♂
Iberian	74	81.0	73.0	153.0 ♀
Blend	72	85.3	90.5	160.0 ♂
Iberian	95	78.0	76.0	163.5 ♂
Iberian	79	77.6	78.8	161.2 ♀
Alpine	69	86.0	72.0	150.0 ♀
Blend	80	82.0	78.0	154.2 ♀
Average		83.8 ♂ 80.9 ♀	78.4	165.8 ♂ 153.9 ♀

TABLE II.—(*See* PLATE II.)

Type.	No.	Cephalic index.	Nasal index.	Stature.
Modified Primitive	76	82.5	97.0	165.2 ♂
Modified Primitive	77	84.8	102.5	160.0 ♂
Adriatic	90	80.0	91.0	170.5 ♂
Adriatic	70	90.2	89.0	173.0 ♂
Modified Primitive	82	80.0	105.0	164.5 ♂
Blend	85	84.0	80.0	162.7 ♂
Blend	66	82.0	79.0	150.4 ♂
Blend	78	81.0	84.0	162.7 ♂
Blend	87	82.0	71.0	175.5 ♂
Average		83.1	90.3	163.6 ♂

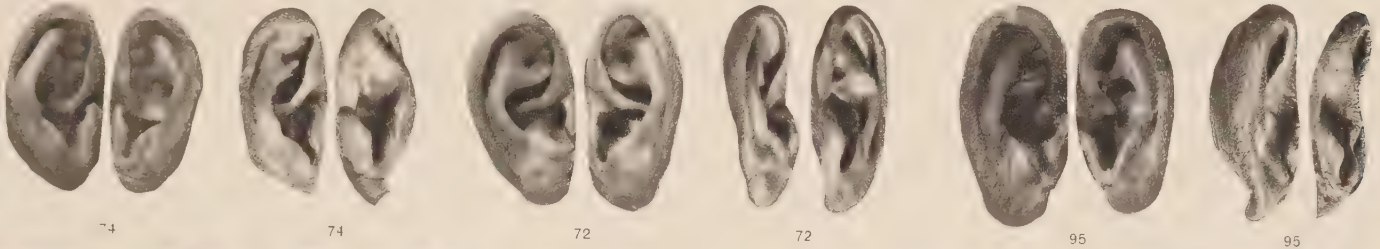
TABLE III.—(*See* PLATE III.)

Type.	No.	Cephalic index.	Nasal index.	Stature.
Primitive	64	89.7	91.0	140.5 ♀
Blend	84	87.0	82.0	168.5 ♂
Australoid	91	83.9	108.1	143.5 ♂
Australoid	71	86.0	98.0	155.0 ♀
Australoid	86	71.0	85.0	146.0 ♂
Iberian	92	77.9	81.6	162.7 ♂
Blend	100	85.0	87.0	157.7 ♂
Australoid	89	77.0	102.5	153.6 ♂
Iberian	98	78.0	78.0	160.3 ♂
Average		81.7	90.3	143.3 ♀

ILLUSTRATIONS.

PLATE I. Modified Iberian ears.
No. 93, Iberian.
No. 94, B. B. B.
No. 96, Blend.
No. 74, Iberian.
No. 72, Blend.
No. 95, Iberian.
No. 79, Iberian.
No. 69, Alpine.
No. 80, Blend.
II. Modified Primitive ears.
No. 76, Modified Primitive.
No. 77, Modified Primitive.
No. 90, Adriatic.
No. 70, Adriatic Modified.
No. 82, Primitive.
No. 85, Blend.
No. 66, Blend.
No. 78, Blend.
No. 87, Blend.
III. Blended ears.
No. 64, Primitive.
No. 84, Blend.
No. 91, Australoid.
No. 71, Australoid.
No. 86, Australoid.
No. 92, Iberian.
No. 100, Blend.
No. 89, Australoid.
No. 98, Iberian.

93 93 49 94 96 96

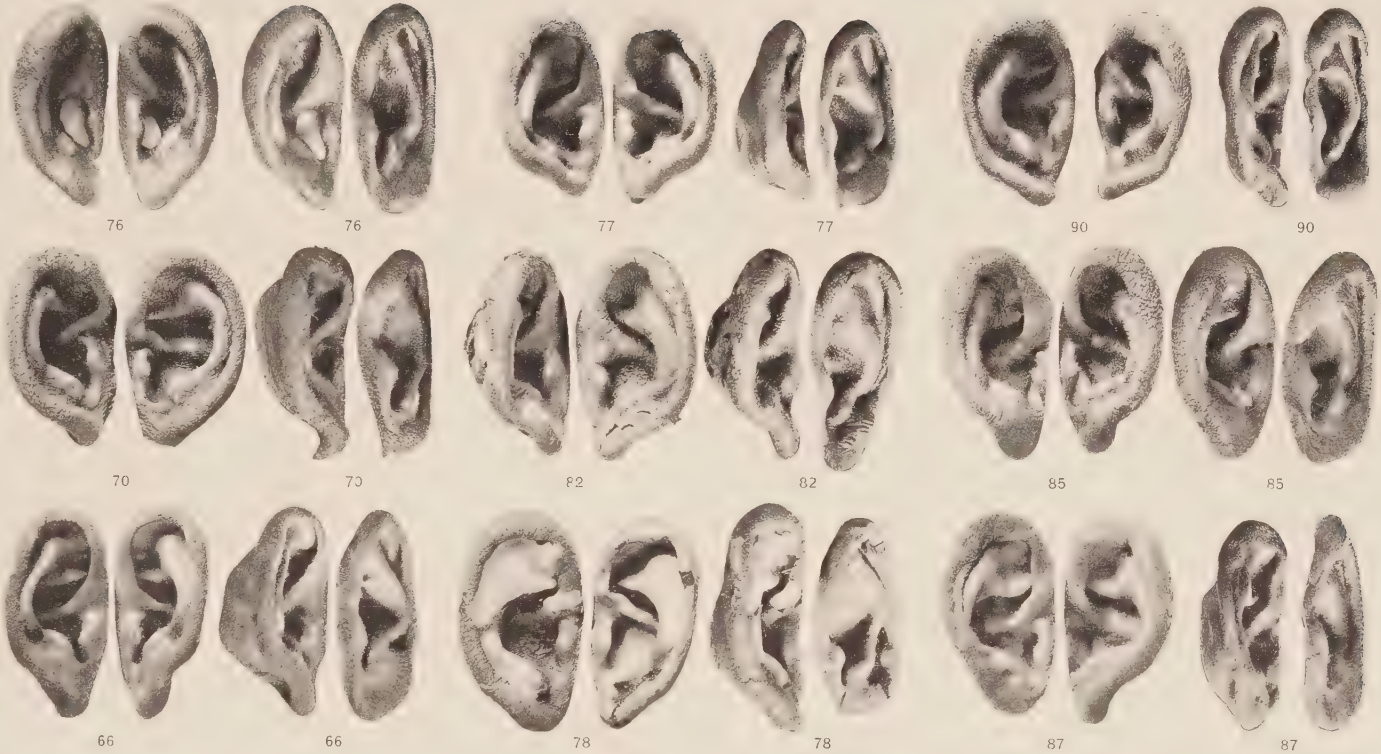


74 74 72 72 95 95

79 79 69 69 80

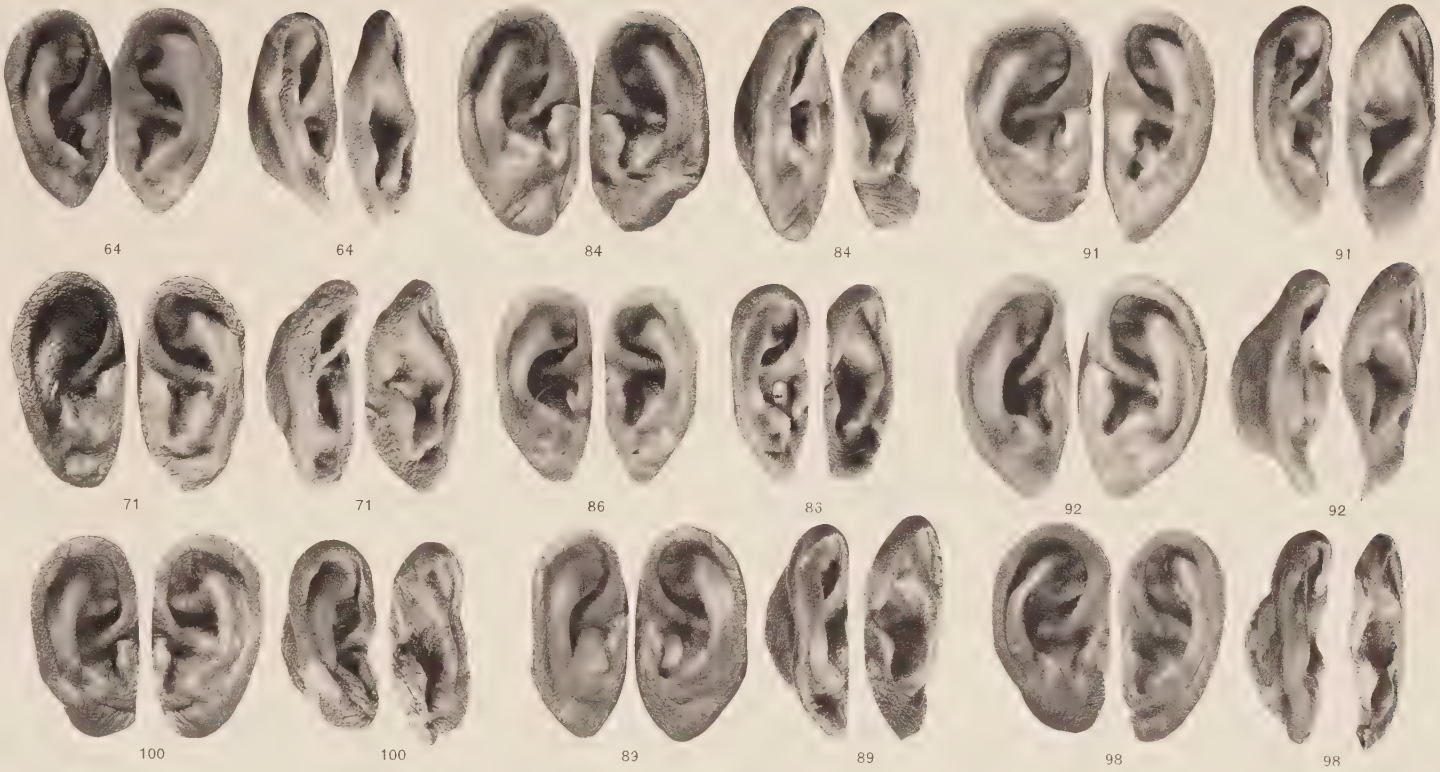
MODIFIED IBERIAN EARS.

PLATE I.



MODIFIED PRIMITIVE EARS.

PLATE II.



BLENDED EARS.

PLATE III.

ADDITIONAL NOTES ON BIRDS FROM NORTHERN MINDANAO, PHILIPPINE ISLANDS.

By Richard C. McGregor.

(*From the Ornithological Section, Biological Laboratory, Bureau of Science, Manila, P. I.*)

In 1907 Mr. Andres Celestino made a small collection of birds in northern Mindanao;[1] recently (1909) he again collected on the Agusan River, securing several specimens worthy of record.

Anous stolidus (Linnæus).

A male was caught on the Agusan River on the last day of December. The collector tells me that the bird made no effort to fly and seemed to have been wounded.

Herodias timoriensis (Lesson).

A female was taken, December 17, on the Agusan River at some distance from the coast. The longer dorsal plumes extend 30 to 40 millimeters beyond the tip of tail; tarsus, 126 millimeters.

Mareca penelope (Linnæus).

One male in worn plumage was killed near Bunauan, Agusan River, on December 17.

Lophotriorchis kieneri (Geoffroy St. Hillaire).

One specimen from Bunauan is similar to the immature male from Tablas [2] except that the thighs are banded with light brown and the upper parts are whiter.

Baza magnirostris Gray.

One female from Bunauan, December 17, is the third specimen of this species to be recorded from Mindanao.

Polioaëtus ichthyætus (Horsfield).

One female from Bunauan, December 17.

Alcyone argentata (Tweeddale).

One male from Bunauan.

[1] *This Journal, Sec. A* (1909), 4, 67–77.
[2] *This Journal* (1906), 1, 772.

NOTE ON THE MIGRATION OF THE TIC-WEE BUZZARD IN THE PHILIPPINE ISLANDS.

By Richard C. McGregor.

(*From the Ornithological Section, Biological Laboratory, Bureau of Science, Manila, P. I.*)

The gray-faced buzzard-eagle or Javan buzzard, *Butastur indicus* (Gmelin), is the commonest and most widely distributed falconid in the Philippines. It has been definitely recorded from not less than twenty-seven islands of the Archipelago. Its general distribution as given by Blanford [1] is Eastern Asia from Japan and China to the Malayan Peninsula and Islands as far as the Philippines, Celebes, and New Guinea.

This species is migratory in a large part of its range and it is on this phase of its life history that I wish to record a few notes. I will first quote a paragraph from Meyer and Wiglesworth [2] as being of particular interest in this connection.

> It is possible to show that this species occurs in the East Indian Archipelago only as a migrant from China, Ussuriland, and Japan during the northeast monsoon, the winter in the latter countries. Such Mr. Whitehead considered it undoubtedly to be in Borneo, and Mr. Everett states that "it appears in Labuan and Northern Borneo in September and remains through the winter. It is quite the most abundant of the migratory as *Haliastur intermedius* is of the [page 47] resident birds of prey in those parts of the island." Mr. Whitehead also remarks it as a migrant in Palawan. Abbé David states that it breeds in the mountains near Peking, although it appears not to be plentiful in China; further south it passes through the lower Yangtse country, as Mr. F. W. Styan writes, "on migration in March and April. A good number travel together, and remain a week or so among the hills on their way; they seem to avoid the plains." Apparently the species is resident, or some remain to breed, in the Philippines, an egg, which appears to belong to this species, having been obtained in Mindanao by Schadenberg and Koch.
>
> Oates [3] records an egg of this species from "Eastern Siberia 29th April (*Dörries*)." This egg is "a regular oval in shape, smooth, fairly glossy, and plain white with a very slight tinge of blue."

[1] Fauna Brit. Ind., Birds (1895), **3**, 365.
[2] Birds of Celebes (1898), **1**, 46.
[3] Cat. Birds' Eggs (1902), **2**, 278.

At favorable points in the Philippine Islands the tic-wee buzzard may be observed passing in great numbers during its autumn migration. In the Island of Calayan I noted this species first on September 18, 1903. On October 14 large flocks were seen and, on the 17th and 18th of the same month, great numbers of birds passed overhead, in a southerly direction, in long, straggling bands.

While I was on Batan Island in 1907, Mr. William Edmonds informed me that numbers of hawks visited Batan each year between October 10 and 20. Later, Mr. Edmonds sent me a specimen of *Butastur indicus*. In December 1908, through the courtesy of Lieutenant-Commander McCormick, of the *Albatross,* three living specimens of *B. indicus* were brought to the Bureau of Science. Two of these had been forwarded by Mr. Otto Sheerer and one had been caught aboard the *Albatross* in the vicinity of Camiguin Island.[4] The following letter to Mr. Dean C. Worcester from Mr. Sheerer contains interesting notes on the habits of the tic-wee buzzard and on the methods of its capture by the natives.

By U. S. ship *Albatross* I beg to send you a pair of those falcons which visit our islands every year in the month of October. At that time the natives of Ivana (Batan) erect on the loftiest ridges behind the pueblo rude watch towers consisting of nothing more than four poles some 15 to 20 feet long stuck in the ground upright, or, better, in a slanting position, overhanging the steep side of the mountain and forming a square of some 4 feet each side, joined in the middle by crosspieces and covered in on top with a mass of branches and leaves. Some 3 feet underneath this thin thatch there is a sort of flooring on which the hunter mounts. The birds arrive regularly at dusk, say 6 p. m. They arrive pretty much tired out and gladly avail themselves of these tree-resembling scaffolds or towers to rest their wings over night. Scarcely settled down to rest, the man underneath reaches out and pulls the struggling bird in by the feet. Thus, a lucky hunter may secure two or three at a sitting. I have tried the thing myself, but the night happened to be cloudy and stormy, and as by 7 o'clock no birds had arrived, as it sometimes happens in such weather, my guide called the game off. I secured, however, these two which had been caught the previous night. They came from the northwest and leave the next day for the southwest. They are fed best on chicken entrails or fish and they seem to prefer their food presented to them stuck on the sharp point of a split bamboo stick.

One of the birds sent by Mr. Sheerer was photographed in Manila and is shown on Plate I.

[4] Man. Philippine Birds (1909), 230.

ILLUSTRATIONS.

PLATE I. *Bustatur indicus* (Gmelin). (From photographs by Charles Martin.)
201

PLATE I.

PHILIPPINE ORNITHOLOGICAL LITERATURE, III.

By Richard C. McGregor.

(*From the Ornithological Section, Biological Laboratory, Bureau of Science, Manila, P. I.*)

Bourns, F. S. and **Worcester, D. C.**: Preliminary notes on the birds and mammals collected by the Menage scientific expedition to the Philippine Islands. *Minnesota Acad. Nat. Sci.* Occ. Papers (1884), **1**, No. 1, 1–64.

A very interesting paper containing descriptions of 36 new species of birds; new localities for 226 species previously known from the Islands; two species, *Caprimulgus jotaka* and *Prionochilus modestus*, recorded from the Philippines for the first time; and additional descriptions and notes concerning some 40 previously little known species. The new species described are: *Ninox spilonotus, Phabotreron cinereiceps, P. brunneiceps, P. maculipectus, P. frontalis, Phlogœnas menagei, Batrachostomus menagei, Ceyx nigrirostris, Centropus steerii, Iyngipicus menagei, Chibia menagei, Oriolus cinereogenys, O. nigrostriatus, Æthopyga arolasi, Æ. bonita, Æ. minuta, Dicœum pallidior, D. sibuyanica, D. intermedia, D. assimilis, Prionochilus æruginosus, P. bicolor, Zosterops siquijorensis, Hyloterpe winchelli, H. major, H. mindorensis, Cryptolopha flavigularis, Geocichla cinerea, Cittocincla superciliaris, Ptilocichla minuta, Iole cinereiceps, I. monticola, Muscicapula samarensis, Rhipidura sauli, Rhinomyias albigularis*, and *R. occularis.*

Bourns, F. S.: A list of the birds known to inhabit the Philippine and Palawan Islands, showing their distribution within the limits of the two groups. See under Worcester and Bourns.

Clarke, W. E.: On some birds from the Island of Negros, Philippines. *Ibis.* (1894), VI, **6**, 532–535.

A list of 25 species of which *Chætura celebensis* is recorded from the Philippines for the first time and *Cinnyris guimarasensis, Pelargopsis gigantea, Thriponax hargitti, Spilornis holospilus*, and *Gallicrex cinerea* are recorded as new to Negros.

Clarke, W. E.: On some birds from the Island of Negros, Philippines. (Second contribution). *Ibis* (1895), VII, **1**, 472–479.

Notes on 12 species; *Falco atriceps* is recorded as new to the Philippines.

Clarke, W. E.: On some birds from the Island of Negros, Philippines. Part III. *Ibis* (1898), VII, **4**, 119–124.

Notes on 41 species, of which 6 are recorded as new to Negros, viz: *Hirundo gutturalis, Caprimulgus manillensis, Microhierax erythrogenys, Porzana fusca, Amaurornis olivacea*, and *Gallinula chloropus.*

Clarke, W. E.: On some birds from the Island of Negros, Philippines. Part IV. *Ibis* (1900), VII, **6**, 351–361, pl. 8.

Notes on 26 species, of which *Phlogœnas keayi*, new species, is described and figured; an unknown *Batrachostomus* and the female of *Caprimulgus griseatus* are described; *Ardea sumatrana*, *Dupetor flavicollis*, and *Nannocnus eurythmus* are recorded as new to Negros.

Dillwyn, L. L.: On an undescribed species of *Megapodius*. *Proc. Zool. Soc. London* (1851), 118–120, pl. 39.

Description and plate of *Megapodius cummingii*, new species, with notes on the nesting habits of the Bornean species.

Elliot, D. G.: On the fruit-pigeons of the genus Ptilopus. *Proc. Zool. Soc. London* (1878), 500–575, pls. 33 and 34, text figs. 1–6.

An elaborate review of the genus and of its literature with descriptions, synonyms, and key to the species.

Finsch, O.: Ueber einen Neuen Nashornvogel der Gattung Penelopides Reichb. *Notes Leyden Mus.* (1903), **23**, 190–194.

Description of *Penelopides talisi*, new species, from Cagayan, northern Luzon.

McGregor, R. C.: On birds from Luzon, Mindoro, Masbate, Ticao, Cuyo, Cagayan Sulu, and Palawan. *Bull. Philippine Mus.* (1903), No. 1, 1–12.

Chibia cuyensis is described as new. Six species, either new to the Islands or of uncertain status, are noted: *Querquedula querquedula*, *Spatula clypeata*, *Phalacrocorax carbo*, *Tachornis infumata*, *Uroloncha fuscans*, and *Sturnia sinensis*. Descriptions or notes of interest are recorded for the following: *Caprimulgus griseatus*, *Oriolus albiloris*, *O. isabellæ*, *Orthotomus chloronotus*, *Nettopus coromandelianus*, *Fuligula fuligula*, *Collocalia marginata*, *Cinnyris whiteheadi*, *Anthothreptes griseigularis*, *Cittocincla superciliaris*, and *Cyanomyias cœlestis*. New localities for species are recorded as follows: Luzon, 5 species; Mindoro, 1 species; Culion, 3 species; Palawan, 1 species; Cagayan Sulu, 12 species; Cuyo, 22 species; Masbate, 10 species; Ticao, 91 species.

McGregor, R. C.: Birds from Benguet Province, Luzon, and from the Islands of Lubang, Mindoro, Cuyo, and Cagayancillo. *Bull. Philippine Mus.* (1904), No. 3, 1–16.

Pericrocotus novus is fully described for the first time and notes of interest on about 40 species are recorded. From Lubang 73 species are recorded; from Verde, 35 species; from Agutaya, 8 species; from Cagayancillo, 45 species; to the Mindoro list 16 are added; to the Cuyo list 15 are added. This paper ends with a list of 72 species from Benguet Province, Luzon.

McGregor, R. C.: The Birds of Calayan and Fuga, Babuyan Group. *Bull. Philippine Mus.* (1904), No. 4, 1–34.

This paper includes descriptions and records of several species which come from neither Calayan nor Fuga and unfortunately their places of capture are not always clearly indicated. The new species are: *Turnix worcesteri*, *Macropygia phœa*, *Otus cuyensis*, *O. calayensis*, *Eudynamis frater*, *Zosterops flavissima*, and *Hyloterpe fallax*. The following are recorded as new from the

Philippines: *Oceanodroma*, species, *Sturna fluviatilis, Polionetta zonorhyncha, Mareca penclope, Spodiopsar sericeus, Chrysomitris spinus, Saxicola œnanthe, Acrocephalus sorgophilus, Chelidon dasypus, Clivicola riparia, Astur cuculoides, Turdus pallidus, Antigone sharpei*, and *Fringilla montifringilla*.

McGregor, R. C. and **Worcester, D. C.**: A handlist of the birds of the Philippine Islands. *Publ. Bu. Govt. Labs.* Manila (1906), No. 36, 1–100.

An enumeration of 693 species with their orders, families, and genera, and with the exact distribution of each species within the Archipelago. This is a useful list.

Mearns, E. A.: Descriptions of a new genus and eleven new species of Philippine birds. *Proc. Biol. Soc. Washington* (1905), **18**, 1–8.

Leonardia, new genus; *Leonardia woodi, Pseudotharrhaleus mindanensis, Macronus mindanensis montanus, Æthopyga boltoni, Cyrtostomus dinayatensis, Anthreptes cagayanensis, Merula kelleri, Gerygone rhizophoræ, Muscicapula montigena, Pardaliparus elegans mindanensis*, new species.

Mearns, E. A.: Descriptions of eight new Philippine birds, with notes on other species new to the Islands. *Proc. Biol. Soc. Washington* (1905), **18**, 83–90.

Turnix suluensis, Muscadivora langhornei, Caprimulgus affinis mindanensis, Phyllergates heterolœmus, Cephalophoneus suluensis, Hyloterpe apoensis, Dicæum davao, and *Lamprocorax todayensis* are described as new. *Leonardina* is proposed in place of *Leonardia* Mearns, preoccupied. Seven species are recorded from the Islands for the first time, namely: *Limonites minutus, Hydralector gallinaceus, Plegadis falcinellus, Herodias timoriensis, Loriculus galgulus, Collocalia francica inexpectata*, and *Hirundo rustica rustica*.

Mearns, E. A.: Note on a specimen of *Pithecophaga jefferyi* Ogilvie-Grant. *Proc. Biol. Soc. Washington* (1903), **18**, 73.

Record and measurements of a specimen from Mindanao.

Mearns, E. A.: Two specimens of *Chætura celebensis* (Sclater). *Proc. Biol. Soc. Washington* (1905), **18**, 185.

Record and measurements of two specimens from Basilan.

Mearns, E. A.: Two additions to the avifauna of the Philippines. *Phil. Journ. Sci.* (1907), **2**, Sec. A, 353.

Butorides spodiogaster and *Spodiopsar cinereaceus* recorded for the first time from the Philippines.

Mearns, E. A.: Descriptions of a new genus and nine new species of Philippine birds. *Phil. Journ. Sci.* (1907), **2**, Sec. A, 355–360.

Malindangia, new genus; *Malindangia mcgregori, Cyornis mindorensis, Centropus carpenteri, Rhipidura hutchinsoni, Hypsipetes batanensis, Merula malindangensis, M. mayoncnsis, Geocichla mindanensis, Zosterops halconensis*, new species. A key to the Philippine species of *Merula* is also given.

Moseley, E. L.: Descriptions of two new species of flycatchers from the Island of Negros, Philippines. *Ibis* (1891), VI, **3**, 46–47, pl. 2.

Cryptolopha nigrorum and *Abrornis olivacea* are described and figured.

Sclater, P. L.: Report on the birds. Report on the scientific results of the voyage of H. M. S. *Challenger* during the years 1873–76 under the command of Capt. George S. Nares, R. N., F. R. S. and Capt. Frank Turle Thomson, R. N. prepared under the superintendence of Sir C. Wyville Thomson Knt. F. R. St. etc. (1881), Zool. **2**, 5–25, pls. 1–6.

Two of the papers deal with Philippine birds. I. On the birds collected in the Philippine Islands, pp. 5–25, pls. 1–6, being a republication from the Proc. Zool. Soc., 1877. The species figured are: *Loriculus panayensis, Batrachostomus septimus, Buceros mindanensis, Dicrurus striatus, Dicæum mindanense, Nectarophila juliæ,* and *Phabotreron brevirostris.*

The other paper is: X. On the Laridæ collected during the Expedition, pp. 133–140, being a republication of Saunder's paper from the Proc. Zool. Soc. 1877. The Philippine specimens recorded are: *Hydrochelidon hybrida* and *Larus ridibundus* from Manila, and *Sterna bergii* from Zamboanga.

Sharpe, R. B.: List of a collection of birds made by Mr. L. Wray in the main range of mountains in the Malay Peninsula, Perak. *Proc. Zool. Soc. London* (1888), 268–287.

Muscicapula westermanni, new species, is described in this paper.

Sharpe, R. B.: Notes on some species of birds of the family Dicæidæ. *Proc. Zool. Soc. London* (1883), 578–580.

In this paper *Dicæum schistaceum* Tweeddale is considered to be the young of *D. rubriventer* Lesson and *D. modestum* Tweeddale the young of *D. everetti.*

Sharpe, R. B.: Contributions to a history of the Accipitres or birds of prey.—I. On the females of the common and South-African Kestrels. *Proc. Zool. Soc. London* (1874), 550–584; pl. 68.

The female of *Cerchneis tinnunculus* is figured.

Sharpe, R. B.: On the genus *Alcyone. Proc. Zool. Soc. London* (1869), 351–357.

Key to and descriptions of all the then known species of *Alcyone.*

Sharpe, R. B.: Additional notes on the genus *Ceyx. Proc. Zool. Soc. London* (1869), 507–511.

A comparison of the arrangement of the species of *Ceyx* as given by Sharpe and by Salvadori, with a key, and with remarks on *Ceyx rufidorsa* and *C. sharpii.*

Sharpe, R. B.: On the genus *Ceyx. Proc. Zool. Soc. London* (1868), 587–599.

A review of the genus with key to and descriptions of the species.

Sharpe, R. B.: On the genus *Pelargopsis,* Gloger. *Proc. Zool. Soc. London* (1870), 61–69.

A review of the genus with key to the species and description of *P. gouldi,* new species.

Sharpe, R. B.: [Classification of the Rallidæ.] *Bull. Brit. Orn. Club* (1893), **1**, No. V, 26–28.

Includes the diagnosis of *Poliolimnas*, new genus, type *P. cinereus* Vieillot).

Sharpe, R. B.: [New birds from the Sulu Archipelago.] *Bull. Brit. Orn. Club* (1893), **3**, No. XII, 9, 10.

Diagnosis of *Scops sibutuensis*, *Prioniturus verticalis*, *Dicæum sibutuense*, and *Edoliisoma everetti*, new species.

Sharpe, R. B.: [On the distribution of the species of the genus *Butorides*.] *Bull. Brit. Orn. Club* (1893), **3**, No. XII, 17, 18.

Notes on *Butorides javanica* and *B. amurensis;* diagnosis of *B. spodiogaster*, new species.

Sharpe, R. B.: [On two new owls.] *Bull. Brit. Orn. Club* (1897), **6**, No. XIV, 47; also Ibis (1897), VII, **3**, 449.

Ninox everetti, new species, described from Siasi.

Sharpe, R. B.: [Notes on the bitterns and herons.] *Bull. Brit. Orn. Club* (1894), **3**, No. XVII, 30–33.

Gives the distribution of the various species of *Ardetta* and calls attention to the name *Ardea manillensis* of Meyen which must be used for the Asiatic race of *A. purpurea*.

Sharpe, R. B.: [On Micropus nehrkorni.] *Bull. Brit. Orn. Club* (1894), **4**, No. XX, 4, 2.

Sharpe shows that *Micropus nehrkorni* of Blasius is really a *Melaniparus*.

Sharpe, R. B.: [Notes on the Muscicapidæ.] *Bull. Brit. Orn. Club* (1901), **11**, No. LXXIX, 60.

Siphia enganensis Grant is referred to *S. herioti* Ramsay; *Dendrobiastes basilanica* Sharpe is said to be without doubt the female of *Muscicapula mindanensis* Blasius and this species should stand as *Muscicapula basilanica* (Sharpe).

Sharpe, R. B.: [Notes on the Ardeinæ.] *Bull. Brit. Orn. Club* (1894), **3**, No. XVII, 37–39.

Sharpe accepts the name *Phoyx* for the large purple herons and proposes, among other new generic names, that of *Mesophoyx* for *Herodias intermedia*.

Sharpe, R. B.: [List of the species of Ardeidæ.] *Bull. Brit. Orn. Club* (1895), **5**, No. XXXI, 10–13; also *Ibis* (1896), VII, **2**, 253–257.

A list of the species of herons and bitterns as determined for the Catalogue of Birds in the British Museum, volume 26.

Steere, J. B.: On the distribution of genera and species of non-migratory land-birds in the Philippines. *Ibis* (1894), VI, **6**, 411–420; also *Auk* (1894), **11**, 232–240.

An elaborate essay in which the author attempts to prove that the law of distribution of non-migratory land-birds of the Philippines may be stated as follows: "*The genus is represented by but a single species in a place. Or in more general terms as follows: No two species near enough alike structurally to be adapted to the same conditions will occupy the same area.*" On this subject see Worcester, *Proc. U. S. Nat. Mus.* (1898), **20**, 567.

Steere, J. B.: The Philippine Islands. Nature, Nov. 8 (1888), **39**, 37.

A letter dated Manila, July 2, 1888. The Philippine Islands defined as a zoölogical province comprising a number of subprovinces, each characterized by representative species of birds and probably of mollusks.

Steere, J. B.: A list of the birds and mammals collected by the Steere Expedition to the Philippines, with localities and with brief preliminary descriptions of supposed new species. Ann Arbor, Mich., July 14 (1890), 1–27.

A list of 367 species with islands on which they were found by the members of this expedition: J. B. Steere, D. C. Worcester, F. S. Bourns, and E. L. Moseley, and with descriptions of the following new species: *Prioniturus luconensis, P. mindorensis, Cyclopsitta mindanensis, Loriculus siquijorensis, L. mindorensis, L. worcesteri, Circus philippinensis, Spilornis panayensis, Thriponax philippinensis, T. mindorensis, Chrysocolaptes samarensis, Yungipicus basilanicus, Y. leytensis, Ceyx samarensis, C. mindanensis, C. basilanica, C. fluminicola, C. bournsi, C. malamaui, Actenoides moseleyi, Centrococcyx mindorensis, Penelopides basilanica, P. samarensis, P. mindorensis, Artamides mindorensis, A. mindanensis, A. panayensis, Edoliisoma (Graucalus) panayensis, Pseudolalage minor, Pericrocotus leytensis, Hypothymis samarensis, Cyanomyas helenæ, Setaria samarensis, Oriolus samarensis, Macronus mindanensis, Mixornis nigrocapitatus, Ptilocichla(?) basilanica, Ptilocichla(?) mindanensis, Irena ellæ, Poliolophus basilanicus, Iole guimarasensis, I. mindanensis, I. siquijorensis, Cittocincla cebuensis, Orthotomus panayensis, O. samarensis, Zosterops basilanica, Philemon philippinensis, Dicæum besti, Prionochilus samarensis, Cinnyris guimarasensis, Corvus samarensis*, and *Sarcophanops samarensis*. Although the descriptions are usually extremely meager and often altogether too short, this is the most important single paper on Philippine birds since Sharpe's report on the Steere collection.

Waterhouse, F. H.: Avium generum index alphabeticus. *Bull. Brit. Orn. Club* (1899), **9**, 1–31.

An index to the genera adopted in the 27 volumes of the Catalogue of the Birds in the British Museum.

Whitehead, J.: Notes on the birds of Palawan. *Ibis* (1893), VI, **5**, 38–61, pl. 2.

A list, with notes, of 157 species collected by Whitehead. *Buchanga palawanensis* is described as new, and *Baza leucopais* is the subject of the colored plate.

Whitehead, J.: Field-notes on birds collected in the Philippine Islands in 1893–6. *Ibis* (1899), VII, **5**, (part I) 81–111; part II, 210–264; part III, 381–399; part IV, 485–501.

An enumeration of 359 species collected or observed by Whitehead, with notes of considerable interest and importance. Most of the species were previously recorded in the series of articles by Grant.

Whitehead, J.: [On a new pigeon.] *Bull. Brit. Orn. Club* (1897), **6**, No. XLIII, 34; also *Ibis* (1897), VII, **3**, 439.

Ptilocolpa nigrorum, new species, described from Negros.

Whitehead, J.: [A new flycatcher.] *Bull. Brit. Orn. Club* (1893), **1**, No. VI, 31.

Diagnosis of *Cryptolopha xanthopygia*, new species, from Palawan.

Whitehead, J.: [On the genus *Dendrophila.*] *Bull. Brit. Orn. Club* (1897), **6**, No. XLV, 49; also *Ibis* (1897), VII, **3**, 450, 451.

Dendrophila lilacea, new species, described from Samar.

Whitehead, J.: [On a new flycatcher.] *Bull. Brit. Orn. Club* (1897), **6**, No. XLIV, 43; also *Ibis* (1897), VII, **3**, 446.

Muscicapula nigrorum, new species, described from Negros.

Worcester, D. C.: Contributions to Philippine ornithology. Part II.—Notes on the distribution of Philippine birds. *Proc. U. S. Nat. Mus.* (1898), **20**, 567–625, pls. 55–61.

This paper consists of a discussion of the zoölogical relationships of the various island groups based upon the evidence furnished by their birds. The divisions are mainly the same as those advocated by Steere, but Bohol is grouped with Leyte instead of with Cebu. Cebu is separated from the central islands, and Balabac and Palawan with the Calamianes are shown to be more closely related to Borneo than to the rest of the Philippines. The conclusions reached are too extended to be repeated here. Steere's law of distribution is fully discussed and shown to be unwarranted by the evidence. The factors of the origin and distribution of the genera and species of resident Philippine land birds are set forth in considerable detail; the conclusions are too lengthy for repetition. A bibliography concludes the paper. Plate 55 is a map of the Philippine Islands. The remaining plates are diagrammatic.

Worcester, D. C.: On a nesting specimen of Caprimulgus griseatus Walden. *Phil. Journ. Sci.* (1907), **2**, Sec. A, 275, pl. 1–2.

Nesting of this species in northern Luzon with reproductions of three photographs of the bird and one photograph of its eggs.

Worcester, D. C.: On a nesting place of Sula sula (Linnæus) and Sterna anæstheta Scopoli. *Phil. Journ. Sci.* (1907), **2**, Sec. A, 275–276, pl. 1.

States that these two species probably nest on Didikas Rocks. The plate is from a photograph of these rocks.

Worcester, D. C. and **Bourns, F. S.**: Contributions to Philippine ornithology. Part I.—A list of the birds known to inhabit the Philippine and Palawan Islands, showing their distribution within the limits at the two groups. *Proc. U. S. Nat. Mus.* (1898), **20**, 549–566.

This is a most useful list; the species and islands are arranged in tabular form with indication of the species collected by the Menage Expedition. See also under Bourns and Worcester.

Worcester, D. C.: Preliminary notes on the birds and mammals collected by the Menage scientific expedition to the Philippine Islands. See under Bourns and Worcester.

Worcester, D. C.: A hand-list of the birds of the Philippine Islands. See under McGregor and Worcester.